Industrial FINISHING

TECHNOLOGY DEPT.

Welcome IRAN... to Membership in UNITED NATIONS

OCT 25 1943

By declaring war on Hitler last month IRAN became the newest member (number 34) of the United Nations. Iran is the official name for Persia, which was the name of a Province, and the people refer to themselves as Irani. The Iranian oil field, at the head of the Persian Gulf, is the richest single oil field in existence and the oil produced there has been of valuable aid to the Allies. In normal times rug exports to the United States average more than three million dollars a year.

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

ADVANCE PAINT COMPANY

Manufacturers of Wood & Metal Finishing Materials

INDIANAPOLIS, INDIANA

Fabric Finishing Time cut 33⅓%

at PAN AMERICAN

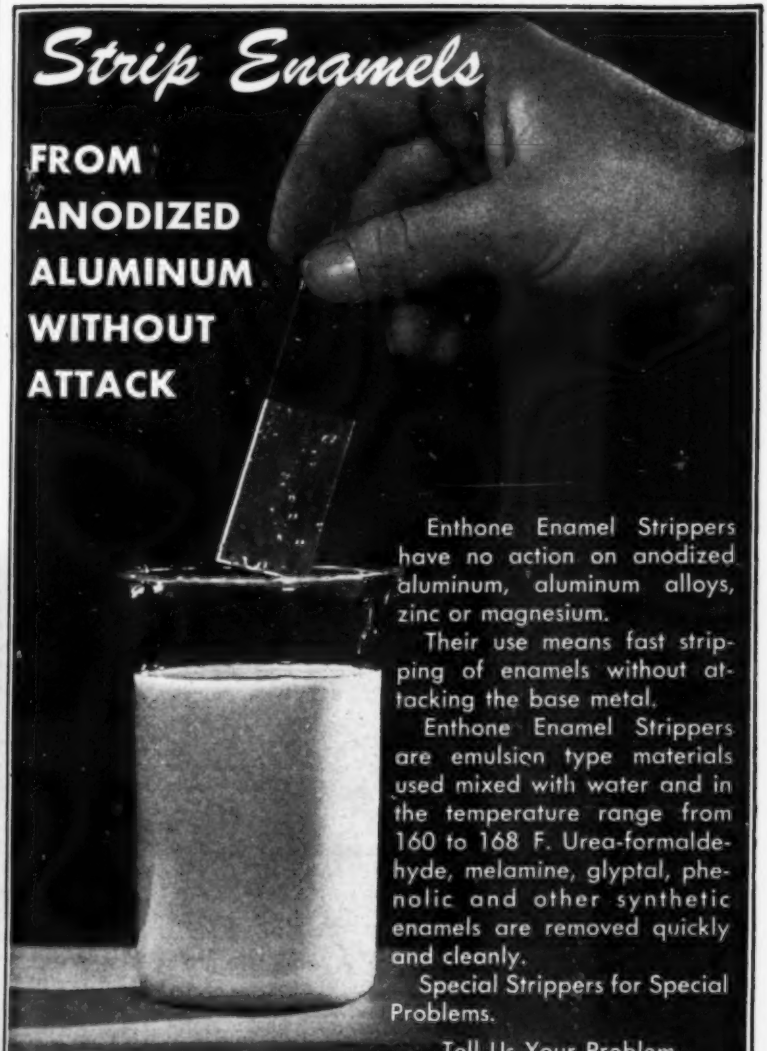
PAN-AMERICAN World Airways' Clipper ships have, during the past year, carried more urgently needed cargo to the fighting fronts through the utilization of the time-saving qualities offered by EMYCEL,* a speed finishing system for aircraft fabric surfaces, because: • 4 or 5 coats of EMYCEL Dope do the work of 7 to 11 conventional coats. • Blushing difficulties encountered during inclement weather are eliminated. • All coats are sprayed, costly, time-consuming hand brushing is eliminated. • EMYCEL protects against mildew rot, it insures greater safety and extends the time between overhauls. The production advantages offered by EMYCEL warrant your consideration, both for current and post-war transport operations. Write for complete details.

**EMYCEL, an all-spray doping system applied at elevated temperatures, is CAA approved.*

ROXALIN *Flexible* FINISHES
INCORPORATED
ELIZABETH, F. NEW JERSEY
BOX 103

Strip Enamels

FROM ANODIZED ALUMINUM WITHOUT ATTACK



Enthone Enamel Strippers have no action on anodized aluminum, aluminum alloys, zinc or magnesium.

Their use means fast stripping of enamels without attacking the base metal.

Enthone Enamel Strippers are emulsion type materials used mixed with water and in the temperature range from 160 to 168 F. Urea-formaldehyde, melamine, glyptal, phenolic and other synthetic enamels are removed quickly and cleanly.

Special Strippers for Special Problems.

Tell Us Your Problem

ENTHONE

THE ENTHONE CO.

442 ELM STREET NEW HAVEN 2, CONNECTICUT

IT'S THE FINISH

THAT COUNTS . .

. . not in the Drum

In war, in peace, it's the finish that counts. But it's *on the job* that it counts—not in the drum or pail. An excellent finish in the container may not be best in production or in improving your product. And so much hangs on even a little finish.

Cost is an important feature of finish yet the finish that is low in price in the drum may be expensive on the finished article. Savings in the drum may have been dissipated along the production line, or may be wiped out when the critical eye of the customer makes a comparison with competitive products. There are too many factors in finish to take a chance. This test should be applied—

WHAT IS SYNERGISM?
In Synergism, forces—minds—work together to produce results greater than both working separately might achieve, making 2 + 2 = 5.

Will the finish in the drum meet the requirements of the finish in application and on the job?

THE PART OF SYNERGISM

That's why we stress synergism at Zapon, in specifying finishes and finishing procedures. Synergism—cooperation plus—between the finish manufacturer, the designer and the product manufacturer helps make certain that the finish *on the job* will give protection, appearance, more finish mileage and lower costs.

Synergism pays. Other manufacturers have found that out. We suggest you get in touch with one of our offices and we'll get together synergistically.

ZAPON

ZAPON DIVISION · ATLAS POWDER COMPANY

Eastern Sales: Stamford, Conn. *Western Sales:* North Chicago, Ill.

INDUSTRIAL FINISHES

NINETEENTH YEAR OF PUBLICATION

Industrial FINISHING

W. H. ROHR, Editor E. A. DOSCH, Assoc. Editor

Vol. XIX, No. 12 OCTOBER, 1943 $2.00 a Year

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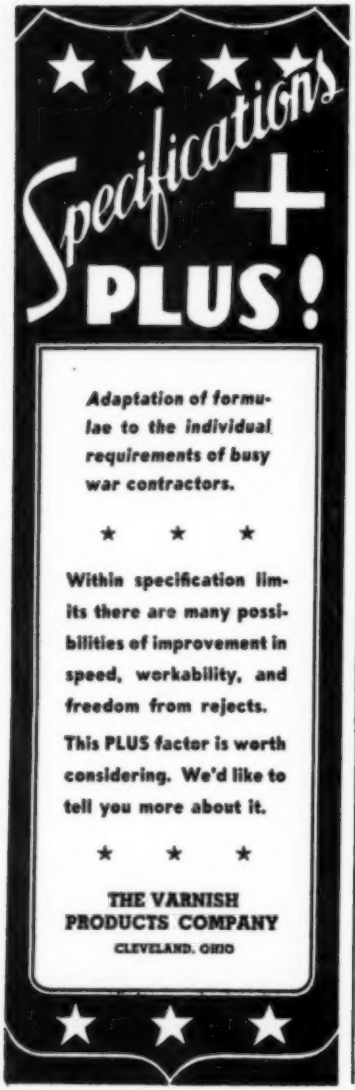
Specifications
+
PLUS!
Adaptation of formulae to the individual requirements of busy war contractors.
★ ★ ★
Within specification limits there are many possibilities of improvement in speed, workability, and freedom from rejects.
This PLUS factor is worth considering. We'd like to tell you more about it.
★ ★ ★
THE VARNISH PRODUCTS COMPANY
CLEVELAND, OHIO

Letters from Readers

Chromic Acid Dips

We are very much interested in your article entitled "Primers for Aircraft Magnesium and Aluminum," by G. C. Close, published in your July issue. We would like to obtain more information regarding the chromic-acid dip process covered by this article, and would appreciate any information you can give us, or recommend where we might obtain the required information.—R. C. Electric Co.

Free Tickets to Radio Shows

EDITOR'S NOTE: The following is a typical letter of appreciation received by LAWRENCE H. SINGER, whose exclusive editorial, "Random Comment on the Industrial Scene," appears in each issue of this magazine. Mr. Singer offers free tickets to radio shows in New York City.

Dear Mr. Singer: I wish to thank you for your effort in procuring the several sets of tickets for me for the various broadcasts a week or two ago. Out of the group received, my wife and I took in four shows. The tickets we were unable to use were handed to service boys, whom I know appreciated and enjoyed them fully as much as we did.—Vincent J. Gilmore.

Cleaning and Painting Used Steel Drums

We are interested in performing reclaiming work on steel drums for the Army under their specifications No. 115. Inasmuch as this particular field is a little out of our line, we are at a loss to know just where to secure the equipment that we will need in order to perform this work.

We need prices, literature and general information as to manufacturers

Wherever you find
Uncle Sam's Air Corps, Signal Corps or Ordnance Depots
you'll probably find

DOLAN'S *"Unquestionable Quality"* FINISHES

We have supplied many thousands of gallons of

★ O. D. LUSTRELESS
★ O. D. SEMI GLOSS
★ REFINISHING PRIMERS
★ ROT INHIBITERS
★ ZINC CHROMATE PRIMERS
★ AIRPLANE DOPES
★ "843" WATER STAINS
★ MARINE FINISHES, ETC.

We invite your inquiries on any Specification Finishes.

V. J. DOLAN & COMPANY, INC.
Manufacturers of "UNQUESTIONABLE QUALITY" *Industrial Finishes*
1830 N. LARAMIE AVE., CHICAGO, ILLINOIS

Dress UP!

Dress up your Holiday items with a beautiful coat of CLAREMONT Flocks, either

Cotton, Wool or Rayon

Give them sales appeal, with added profit at very little added cost, with this finish which hundreds of manufacturers are using for profit.

CLAREMONT FLOCKS
SET THE STANDARD FOR QUALITY

Write for color card and samples!

CLAREMONT WASTE MFG. CO.
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The country's largest manufacturers of Flocks

United's NEW WRINKLE

Made from Non-Critical Oils

The use of critical oils in wrinkle finishes has been prohibited due to a critical shortage.

United's Technical Staff has met this challenge by developing a new wrinkle which is formulated from non-critical oils. It has the characteristics of our standard wrinkle regarding appearance, uniformity, application, and baking schedule, etc. It is available in various colors and shades.

A trial order will convince you of its merits.

United Lacquer Mfg. Corp.

General Offices & Factory: LINDEN, N. J.
New England Mfg. Div.: Boston, Mass.
Lacquers — Synthetics and Special Protective Coatings for All Surfaces

I. C. D. FORMULA NINE

NON-INFLAMMABLE « wax free REMOVER »

for paint, varnish, lacquer, baked enamel, adhesives

EASY TO APPLY—NO AFTER-CLEANING

ORDER TRIAL GALLON AT DRUM PRICE

I. C. D. FORMULA 9 is the standard of safety and quality . . can be sprayed or brushed . . doesn't raise grain nor discolor . . quickly removes all kinds of finishes and coatings . . costs less to use . . saves time, labor and material.

SPECIALTY COATINGS—I. C. D. Labs. have specialized in the formulation and manufacture of non-inflammable coatings and substitute finishes. If you have a tough coating or finishing problem send in your specifications, finishing schedule and requirements. Immediate action and a prompt reply promised.

INDUSTRIAL CHEMICAL DEVELOPMENT CORP.

of the following equipment, all for 55-gallon steel drums:

1) Rotating devices and vats for caustic cleaning of exteriors and interiors of drums.

2) Rotating devices for rolling drums while being painted with spray guns.

3) Hydrostatic pressure device for removing dents from sides and heads of drums.

4) Small but efficient and economical baking oven for drying paint on drums at the rate of 10 to 20 per hour.

5) Inexpensive conveyor system for handling and moving drums; also, tumbling device for cleaning rust from interiors of drums.

If you will kindly pass this information along to the various manuafcturers known to you, we will certainly appreciate it. Under separate cover we are today subscribing to your very interesting magazine, INDUSTRIAL FINISHING.—A. Z. Co.

Information supplied.—ED.

Heat-Indicating Papers

Will you be kind enough to inform us where we may obtain information concerning the "Heat-Indicating Papers" that were mentioned on page 7 of the August issue of INDUSTRIAL FINISHING?—Dominion Electrohome Industries Limited.

These papers can be obtained from Nashua Gummed & Coated Paper Co., Nashua, N. H.—ED.

Primers for Aircraft Magnesium

We would appreciate the privilege of receiving from you one reprint of the following article, which appeared in INDUSTRIAL FINISHING, July 1943: "Primers for Aircraft Magnesium, Aluminum," by G. C. Close. Mail to our Engineering Library, Bldg. 5-7.—R. C. A. Victor Div.

The surface finishing of magnesium is of particular concern to us in connection with several post-war problems. Please tell us where we may obtain detailed information on this subject.—F. S. G. (Industrial Design.)

For Spraying Hot Wax

We are in need of spray equipment, and are wondering if you would be good enough to please send us a list of companies that manufacture spray equipment designed to spray a hot (110°-140° F.) liquid wax onto the exterior surfaces of 37-mm steel cartridge cases?

It is important that such equipment will not only handle and spray

GET NEW
Rich
Colorful
EFFECTS
WITH
Cellusuede
FLOCK

Easily applied to cloth, paper, metal or wood with a spray gun or by sifting. Rayon and Cotton Flocks supplied in one pound bags, twelve to a case, solid or assorted colors. Also supplied in 10 and 50 pound bags. Wide variety of standard colors. Special colors, if desired, in lots of 100 pounds or over. Many distinctive color effects produced by varying shade of adhesive and flock. Write for Color Card, samples, detailed information.

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RONAN

"MARK-IT"

TYPE A (Lacquer Type). These colors are waterproof and sunproof. They may be used with a marking brush or sprayed through stencils. Immediate drying. Work equally well on paper, cartons, wood cases, fabric or other packaging materials. Available in U. S. Army Specification colors for Ordnance, Air Force, Engineers, Chemical Warfare, Quartermasters, Signal, Medical and Transportation. Also Black-out Tan, Clear and Olive Drab.

TYPE B. Fast-drying paste colors for roller coating and striping. Dry flat in 2 minutes.

TYPE C. For silk screen application.

Write for details, prices and color card.

RONAN

T. J. Ronan Co., Inc.

749 E. 135th St., New York City

Paints — Varnishes — Lacquers

the hot liquid wax, but it is also important that the equipment will maintain the wax at this temperature.—V.

Information furnished.—ED.

I. F. Article Reprinted

We would appreciate it very much if we could have permission to reprint the article entitled, "Painting Woven Wire Fences," which appeared in your May 1943 issue. We are contemplating using this on a single sheet of paper, letter-head size, to be used as a direct-mail piece of advertising, and also to be given by the salesmen to their prospects.

The article will be used as published, with absolutely no changes whatsoever in the copy. There will be a notation appearing at the top which will read, "Reprint of article which appeared in the May 1943 issue of INDUSTRIAL FINISHING."—JAMES B. SIPE & CO.

Permission granted.—ED.

Works on Dipped Wood Too

In the September issue of INDUSTRIAL FINISHING, on page 22, there is an article by H. L. Thomas covering dip finishing. We wonder if this electrostatic detearing device would work on wood furniture, as the published article deals only with steel shells? At any rate, we would like to have more information about this.—T. Co.

Harold Ransburg, inventor and manufacturer of the equipment, advises us that it does work satisfactorily on dipped wood products, and that such an installation is in operation.—ED.

Homesick

I am not working in a wood finishing room at present, but get homesick to get back to it. I have been working in a large industrial plant for the past two years. Am doing metal polishing and get a lot more money than I ever received as foreman finisher, but I get homesick just the same.—G. L. B.

Clear Sanding Sealer

Please give us the names and addresses of firms that specialize on clear white sanding sealer (lacquer type) and clear white lacquer. These products are to be used for finishing bleached wood bedroom sets, therefore we want them as white as possible.—L. M. (in Mexico).

LACQUERS

★ *If you are one of those* who believe that quality in Lacquers and other Finishing Materials is being overlooked—or intentionally disregarded—because of war conditions, isn't it time to investigate the latest

STILLE-YOUNG LACQUERS

and see that high quality—both in priority and non-critical items—is not only desirable, but obtainable?

Why not be included in the long list of those who approve our

E-K-5 #6169
#7000 #1
LACQUERS

whose qualities are proved every day in actual use?

The ALERT MANUFACTURER is never too busy to consider a better product.

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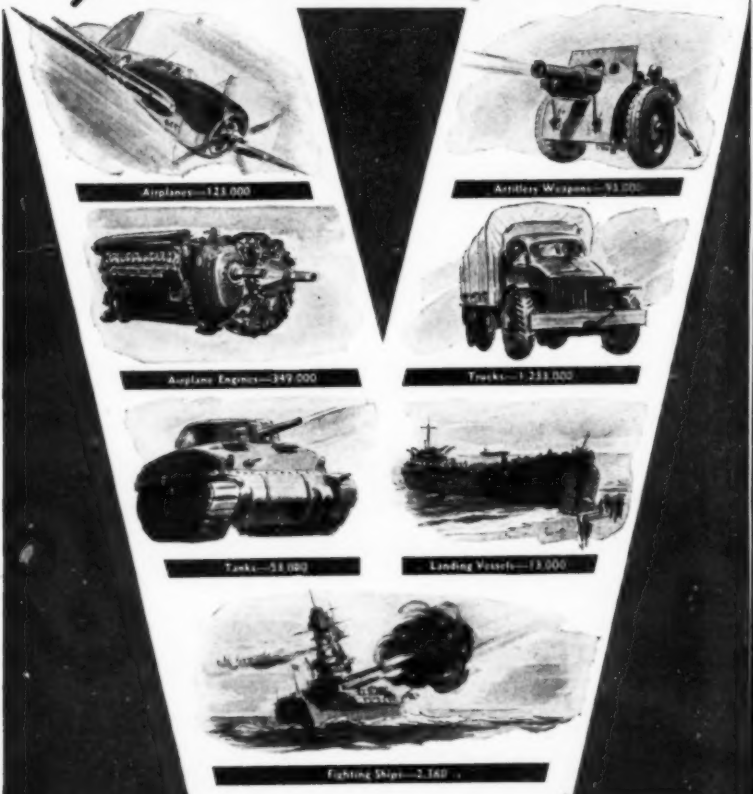
2300 North Ashland Avenue Chicago, Illinois

Organic Finishing Materials



War Material illustrated above was produced ***and delivered*** in the quantities indicated right here in the U. S. between May, 1940 and September, 1943. These figures are from the President's message to Congress. They are stupendous—

THE LILLY COMPANY
HIGH POINT, N. C.

...have gone to WAR...

...in a BIG way!

★

...yes, but even more stupendous is the quantity of finishing material required to finish these items—perhaps billions of gallons. And in addition to these there are literally thousands of other implements and accessories of war that require painting with organic finishing materials. Yes, organic finishes have gone to war in a BIG way—and Lilly's Finishes are doing their full share. They are being used on many war products for protection, identification, camouflage and numerous other purposes. They are being supplied from three advantageous locations—Indianapolis, High Point and Gardner, Mass. Get in touch with the one nearest you.

LILLY VARNISH COMPANY
INDIANAPOLIS, IND.

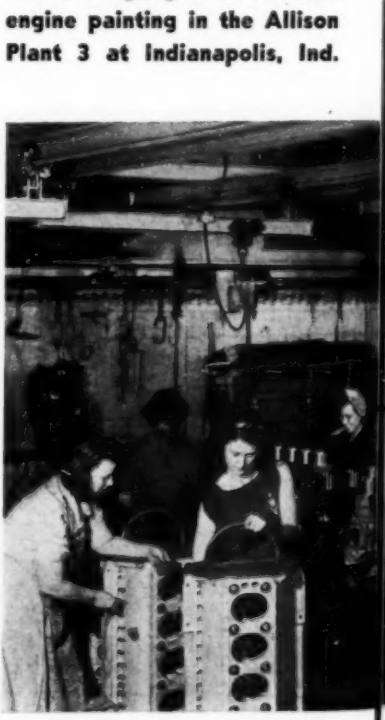
Production Painting of A

Surface preparation, masking of those areas which are not to be painted, conveyor travel from one operation to another, spray painting, circulation of paint through piping to guns, oven baking, removal of masks, and final touch-up work; these are the highlights of aircraft engine painting in the Allison Plant 3 at Indianapolis, Ind.

ALLISON aircraft engines, which power such well known American airplanes as the P-38—Lightning, P-39—Airacobra, P-40—Warhawk, and P-51—Mustang, are manufactured in a number of new modernly-equipped plants located in Indianapolis, Ind. These plants are designated as the Allision Division of General Motors Corp. They are establishments of intense activity, with the production of powerful aircraft engines moving along steadily and continuously — even when in some parts of the plant changes are being made in methods, materials, equipment and the production layout.

As in the manufacture of most other war products, the preparation of surfaces to receive protective coatings, and the application and drying of these paint coatings, are essential parts of the production set-up. These coatings protect the metal surfaces from exposure to the elements during temporary storage in this country, while enroute overseas, and while in service on fighting fronts in various parts of the world. They protect surfaces of the metal from contact with oil, gasoline, cooling fluids and other materials, some of which could prove harmful under certain conditions.

Previous to the opening of Allison Plant 5 for full production, practically all parts for engines were painted with the facilities described and illustrated in this article. Now, however, the compact conveyorized department in Plant 3 paints only the larger parts of aircraft engines; for example, such parts as crank cases,

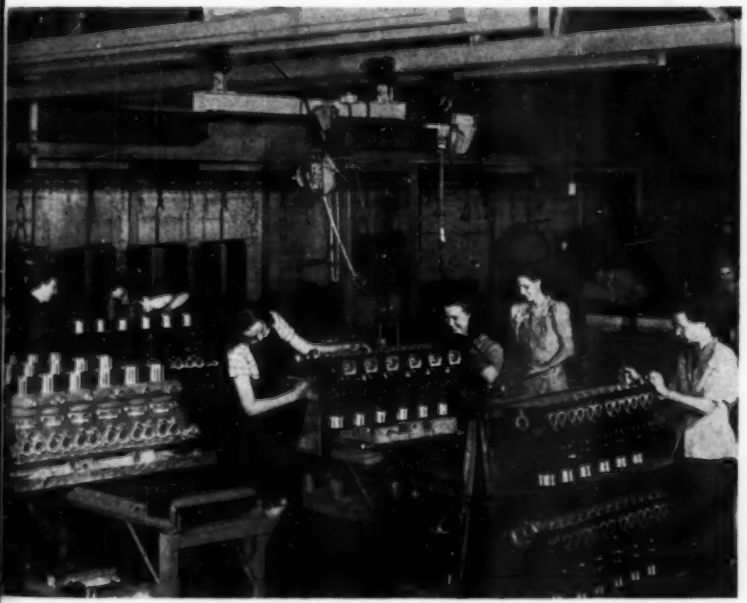


cylinder heads and covers, coolant jackets, accessories housing and oil pans. Some changes have been made in the original layout and in certain methods and facilities used. Others probably will be made from time to time, as plans for improvement are continually occurring to the personnel in charge of production and being presented for adoption when conditions justify the step.

A simplified layout of the present paint room set-up is shown in one of the illustrations with this article. It includes masking tables, overhead traveling electric hoists for lifting castings to and from the chain conveyor, a water-wash spray booth large enough for three or four operators, paint mixing room, and a conveyorized oven wherein the coatings are baked. While the equipment is more or less of standard make, the way in which it is used in actual operation presents several features of interest.

As stated previously, only large castings of aluminum and mag-

Masking the surfaces not to be painted. Traveling electric hoists above are used to lift castings onto masking tables, and on and off the overhead chain conveyor.



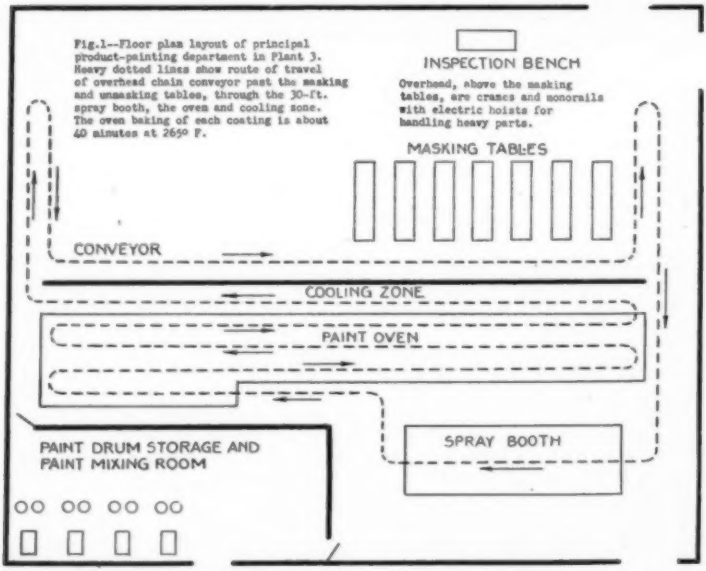

INSPECTION BENCH
Overhead, above the masking tables, are cranes and monorails with electric hoists for handling heavy parts.
MASKING TABLES
CONVEYOR
COOLING ZONE
PAINT OVEN
SPRAY BOOTH
PAINT DRUM STORAGE AND PAINT MIXING ROOM

Fig.1--Floor plan layout of principal product-painting department in Plant 3. Heavy dotted lines show route of travel of overhead chain conveyor past the masking and unmasking tables, through the 30-ft. spray booth, the oven and cooling zone. The oven baking of each coating is about 40 minutes at 265° F.

nesium enter this department to be masked, spray painted, and for the paint to be oven dried. Products enter and leave on trucks through a door near the masking tables. These castings have all been machined and a few are subassembles before they enter the paint department. They have been cleaned and surface-treated in preparation for painting. Aluminum castings have been anodized, while the magnesium castings have been "dichromated."

Women work at the masking tables, masking out machined surfaces, drilled holes, the projecting ends of bolts and nuts of sub-assemblies, and various open spaces. This calls for good eyesight, quick movements and accurate dexterous manipulation. Small overhead electric hoists — traveling hoists— are available to lift the castings from trucks to masking tables and from the masking table to the overhead conveyor.

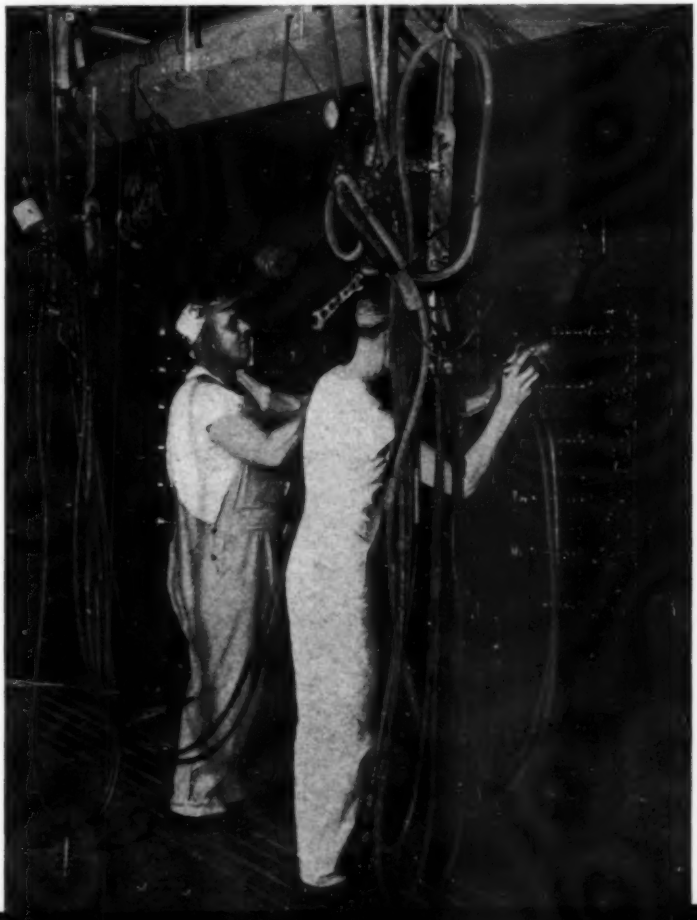
The women do this work so easily, quickly and smoothly that it appears to require no effort at all. With their slender nimble fingers and close attention to detail, they are skillful and efficient at the masking job, once they learn it. While the engine castings are large and massive in appearance, they are really not so heavy in weight; in fact, they weigh only a fraction of what they would if they were made of cast iron and steel.

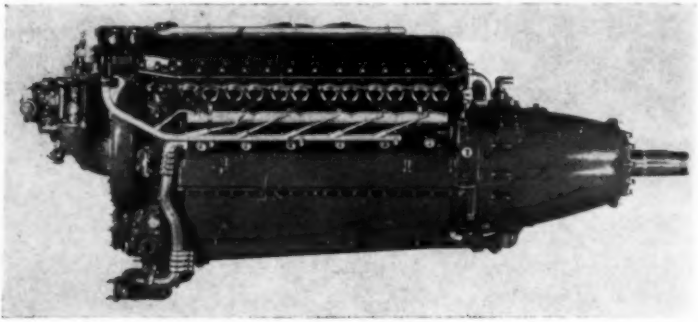
Variety of Masks Are Used

A considerable variety of masks and shields have been developed and placed in service for masking the machined castings and subassemblies for Allison engines. These include pre-cut masks which

are cut from masking tape (some the size of a nickel), small shields made of sheet steel, wing nuts (closed at the top) to thread over the projecting threaded ends of sub-assembly bolts and nuts, thumbscrews fitted with lock nuts, flat plates to cover open areas and machined surfaces, clamp-plates with looped bars to be hooked to the chain conveyor, etc. In fact, for every area that must not be painted there is a mask or shield especially designed to cover it accurately and quickly. While these removable masks are positioned temporarily, they must be fastened securely enough to keep their posi-

Spraying engine castings as they pass through the long water-wash spray booth.





An Allison engine completely painted and ready to be installed in an airplane.

tion during all of the time the part is moving through the spray booth, drying oven and cooling zone. A few of the metal masks are fastened in place with one or more quick-acting clamp screws. Small raised places around threaded holes are covered with pre-cut discs of masking tape.

To Conveyor; to Spray Booth

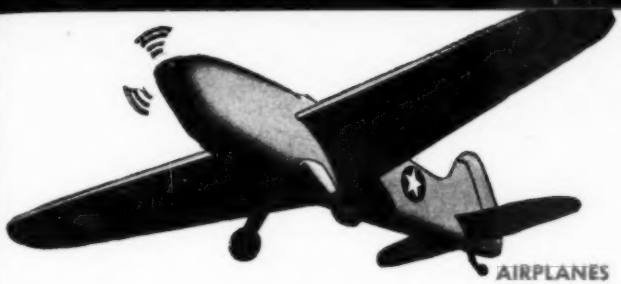
When a casting is completely masked it is lifted by an overhead hoist, moved over to the conveyor and attached to one of the swivel C-hooks hanging from the overhead chain. There it remains through repeated spray-painting and oven-drying operations. When the spray painting and drying are complete, the casting is removed from the chain and placed on one of the tables where masks are taken off and where some slight touch-up work is performed when needed. Castings can be easily hooked on and removed from the conveyor because it travels only approximately 6-ft. per minute.

The steel cylinder barrels, which project six in a line from a cylinder head, are covered with a single wood-and-paper mask that makes an easy press fit over the end cylinder barrels. These six-in-line masks are positioned and removed by the spray operators, therefore fewer of them are needed, as they remain at the spray booth instead of continuing around through the oven.

All Castings Receive Zinc Chromate Primer Coat

During the first pass through the spray booth, the masked castings receive a coat of zinc chromate primer. This goes on both aluminum and magnesium parts. At this writing, the colors of enamels put on over the zinc chromate primer are gray and black. Which parts are painted gray and which are painted black depends upon the location or position of the parts in the final aircraft engine assembly. Aluminum parts receive two coats of enamel in addition to the zinc chromate primer. Magnesium parts receive three coats of enamel in addition to the primer coat.

Since every coat of paint is sprayed on at the same booth, and since these painted parts all pass the masking tables after each trip



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Ours were among the first protective coatings to go on war materials when our country launched its defense program . . . First, because we had the "know how" resulting from three-quarters of a century's service to industry. Today MURPHY coatings are serving the armed forces in an ever-increasing variety of ways.

If you require a protective coating for war use, and want the benefit of wide experience in serving war needs, PUT IT UP TO MURPHY. Do it now, so as to give us time to get in our allocation requests for the necessary raw materials. Your order should specify end use, contract number, specification and priority data, delivery date, etc. In this way, we will be able to give you the best service possible.

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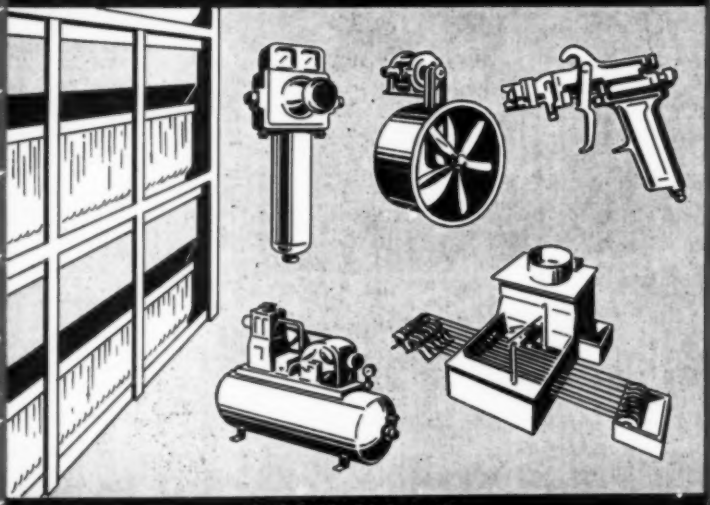
FIRST-AID BOXES
PROPELLERS
GUNSTOCKS
STERILIZERS
GUN-FIRE CONTROLS
NAVY LOCKERS
SOUND DETECTORS
ARMY LOCOMOTIVES
AMMUNITION

A list that's constantly growing

MURPHY *Protective* COATINGS

NATIONWIDE SALES, ENGINEERING AND ERECTION SUPERVISION SERVICE



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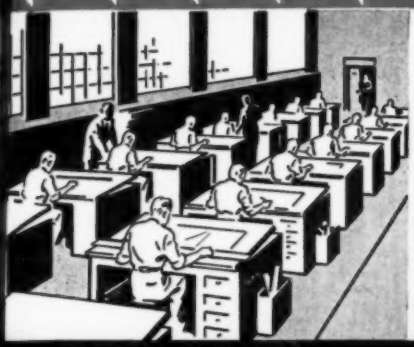
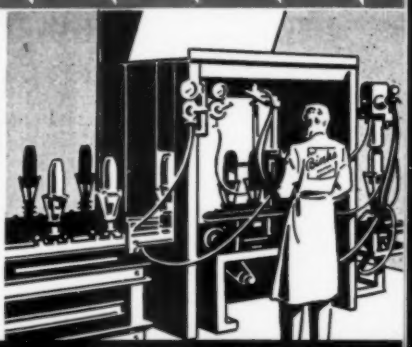


DESIGN AND DRAFTING



RESEARCH AND TESTING

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SPRAY GUN - SPRAY BOOTH - ACCESSORY

Research and Testing — a continuous program by field and plant engineers to develop better, more economical and faster finishing equipment . . . both manual and automatic . . . large and small.

Designing and Drafting — Every installation is tailor-made by Binks own engineers to the exact needs of the specific application.

Nation-Wide Sales and Engineering Service — in 24 major industrial centers make Binks conveniently available to all.

A Complete Line — Everything for spray finishing from small portable units to giant finishing departments capable of accommodating assembled bombers.

COMPANY 2114-2129 CARROLL AVE., CHICAGO, U.S.A.

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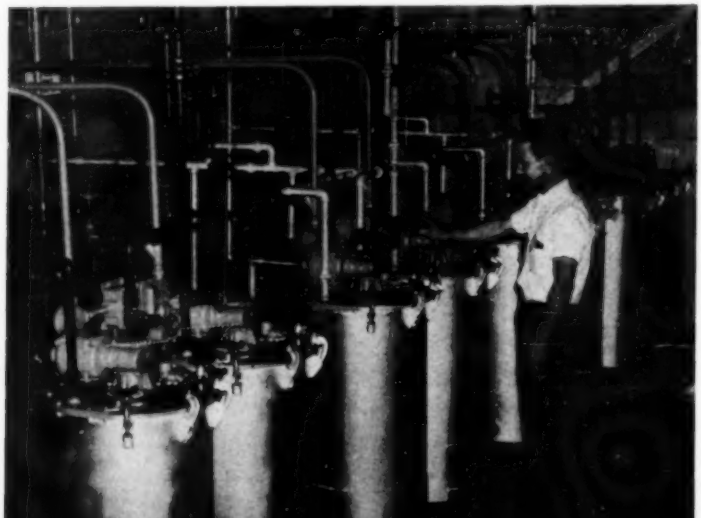
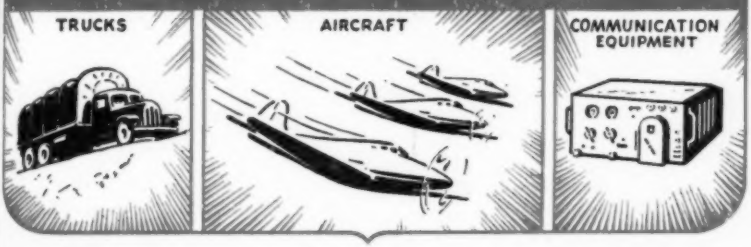
through the oven, some means is needed to enable the girls, who do unmasking, to know whether a part passing their station requires another coat of paint or is ready for removal from the conveyor. This is easily taken care of by the spray operator. He has a tray of large washers handy and when he sprays on the first coat of gray or black, he hangs a washer to the C-hook that holds the part. After he sprays the final coat of black or gray on the part, he removes the washers from the hook. When that part reaches the unloading tables, with no washers on the conveyor hook, it is a signal to the unloaders that it can be removed and stripped of masking.

Removal of the masks is done carefully, quickly and skillfully by women workers. All used adhesive masks are discarded. Permanent masks of metal are removed, cleaned if necessary, and returned to trays at the masking tables where they are used over again. When these metal masks become too heavily coated with repeated coats of paint they are withdrawn from service long enough to run them through a tank of stripping solution which cleans off all of the accumulated paint. When the masking is removed, all the surfaces adjoining masked areas are carefully inspected. If any places need touching up, this is taken care of immediately. One of the girls brushes on a bit of paint of the correct color. *(to page 22)*



Paint-mixing room where paint materials are prepared and checked for viscosity, and from which they are circulated through pipe lines to the spray operators.

Degrease Parts *FASTER* Before CADMIUM PLATING On These Weapons of War



WAR production is QUANTITY OUTPUT at a FAST pace. This means that in cadmium plating your war products, for example, steel parts must be rid of drawing, stamping, buffing compounds, smut, shop dirt, oil and grease FASTER . . . also MORE THOROUGHLY if that CHEMICALLY CLEAN surface is to be obtained which is so essential to durable, uniform finishes.

A WAR MATERIAL for WAR WORK!

Specially designed for anodic degreasing, Oakite Composition No. 90 fully meets these exacting requirements. In addition, it is safer to use because its foam density does not build up hydrogen in quantities, thus assuring greater safety from explosion due to arcing.

COMPLETE DATA FREE on REQUEST!

Used in plating departments and shops the Nation over, Oakite Composition No. 90 is proving to be today's best, most dependable way to clean steel by reverse current before cadmium plating. Write today for complete data.

OAKITE PRODUCTS, INC., 32F Thames St., NEW YORK 6, N. Y.

Technical Service Representatives Located in All Principal Cities of the United States and Canada

OAKITE MATERIALS...METHODS...SERVICE

CLEANING FOR EVERY CLEANING REQUIREMENT

Departmental inspection follows before the painted castings are removed from the department by truck.

Paint Circulating System; Room Air Conditioning

A fireproof room adjoining the spray room is fitted up for limited storage of paint drums, and for paint mixing. It contains four complete units for the paint-circulating system. Each unit includes two large paint tanks, one for mixing paint and solvent, and one for holding a supply of the prepared material which is distributed through one of the pipe lines to the spray booth. For each pair of tanks there is a circulating pump. On the zinc chromate primer line, which requires a special type of pump, an additional pump is installed so it is available in reserve for use in emergencies.

Strict uniformity of the paint mixture, and the spraying pressures at which it is sprayed, are carefully maintained at all times. The condition of the paint room air — as to its temperature, humidity and circulation — remains reasonably constant throughout the year because the entire plant is air conditioned. Viscosity tests are made with a Ford cup whenever new batches of material are prepared. The regulation of spray pressures is definitely set by the foreman and can not be changed by any spray operator or other unauthorized person.

The entire paint room is well lighted with overhead fluorescent lighting. It is adequately ventilated and is kept clean at all times. Fire prevention precautions and cleanliness are in evidence throughout the department. Automatic equipment is available for extinguishing a fire that might possibly start in or near the paint department. The paint mixing room is enclosed within fireproof walls and doors, the fire doors being set to close automatically if or when a fire occurs either inside or near the outside of the paint-mixing room.

Joins Paint Division of Aluminum Industries

Miller G. Robinson has been appointed manager of engineering Service of the Paint Division of Aluminum Industries, Inc., Cincinnati, O., according to an announcement by M. M. Carmody, sales manager.

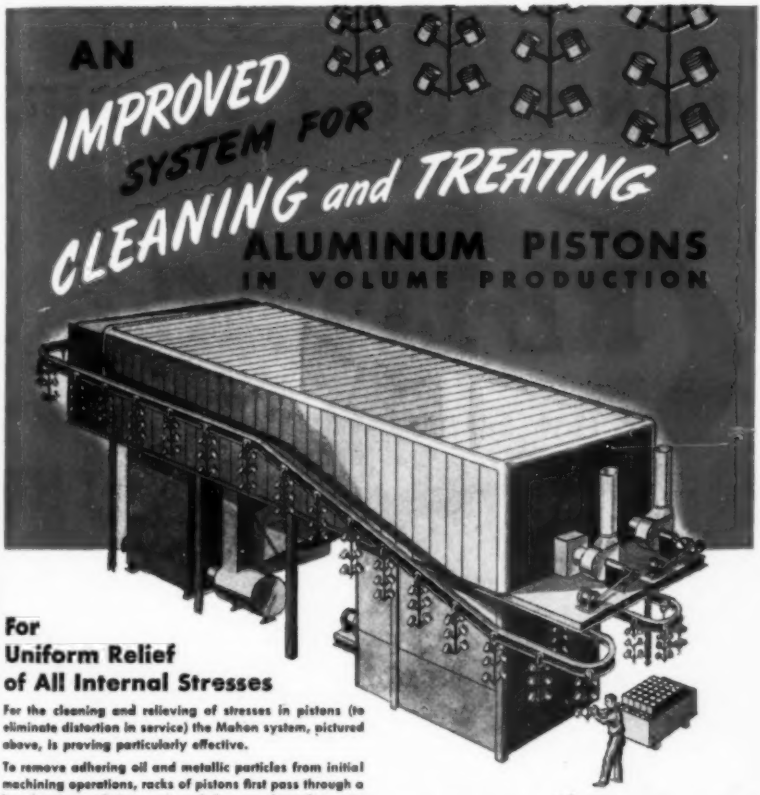
M. G. Robinson, long experienced in Paint Engineering, Service and Sales work, has become affiliated with the Paint Division of Aluminum Industries.

A veteran of the industry, Mr. Robinson brings with him to his new position a background of 34 years of experience in paint engineering, service and sales work. With Aluminum Industries, Mr. Robinson will be in charge of all paint engineering service for the company.

Army-Navy "E" Awarded Chicago Wheel

The Chicago Wheel & Mfg. Co. was honored at plant ceremonies held in Chicago on August 27th, when the Army-Navy "E" Award Pennant was presented by Col. C. J. Otjen, commanding officer, 3rd District, 6th Service Command. The presentation of employe merit pins was made on behalf of the U. S. Navy by Lt. Comdr. E. R. Smith. Colonel Otjen pointed out that "the outstanding and unusual record of the company in the production of small grinding and mounted wheels, largely as sub-contractors, merited the special recognition."

AN IMPROVED SYSTEM FOR CLEANING and TREATING ALUMINUM PISTONS IN VOLUME PRODUCTION



For Uniform Relief of All Internal Stresses

For the cleaning and relieving of stresses in pistons (to eliminate distortion in service) the Mahon system, pictured above, is proving particularly effective.

To remove adhering oil and metallic particles from initial machining operations, racks of pistons first pass through a hot cleaning and rinse unit and then up through a specially designed, gas-fired oven, regulated to a constantly uniform predetermined temperature. Uniformity of oven heat is achieved by continuous re-circulation of an exceedingly large volume of the heated air which completely surrounds and heats each piston *all the way through*—maintaining it at the required temperature for proper processing throughout its oven travel. The system is unusually compact—and entirely automatic—ONE man handling all loading and unloading operations.

Primarily developed for a large manufacturer of aluminum aircraft engine pistons, this practical Mahon system is readily adaptable to any aluminum alloy part or fitting.

Mahon engineers will give you any further particulars you desire and will fully cooperate in working out a similar system suitable to your plant and product.

THE R. C. MAHON COMPANY
DETROIT CHICAGO

Fabricators of Machine Bases and Frames and Many Other Welded Steel Plate Products

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NON-CRITICAL FINISHES W

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- SPRAYS SMOOTHLY
- DRIES QUICKLY
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FINISH
IN FULL GLOSS OR SATEEN

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- HANDLES IN AN HOUR
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OUISVILLE, KY.,—CHICAGO, ILL., U. S. A.

Cleaning Steel Before Painting

EDWIN C. RINKER
Oakite Products, Inc.

THE MANNER in which a metal surface is prepared for painting is a vital factor in the quality and serviceability of the finished article.

As the main functions of a finish are to provide a decorative and/or a protective coating, the choice of the proper cleaning method and materials is of utmost importance. Regardless of the quality of the paint, if it is applied over an improperly prepared surface, its protective value, as well as its decorative effect will be impaired.

As this article is concerned with the preparation of steel, a metal subject to corrosion, the emphasis of securing a properly prepared surface is not unduly exaggerated.

Surface Conditioning

If paint is applied over a surface having a layer of dirt, oil, grease, finger marks, rust or scale, the paint will tend to blister, crack or peel. Another important point to keep in mind is the surface of the metal itself. If paint is applied over a smooth surface, there is no tooth to which the paint can interlock and provide a mechanical bond to the metal. Furthermore, due to improper cleaning or application of the paint film, if the coating becomes porous, the exposed area rusts, as an electro-chemical action takes place. This action continues and, as a result, the area of rusting creeps back between the metal and the paint film. Therefore, in preparing a surface for painting, three important functions should be considered:

1) Removing the surface soil.

2) Roughening or etching the surface to provide for mechanical bonding of the paint.

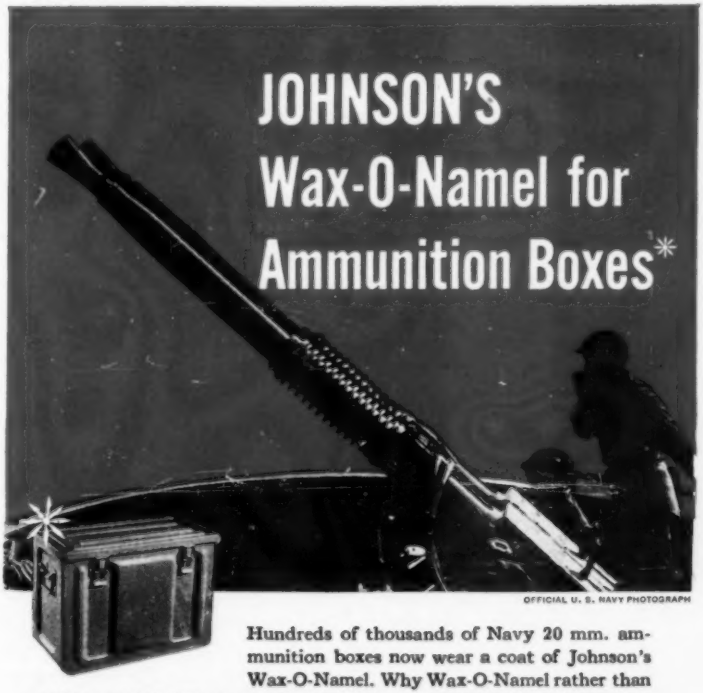
3) Providing a surface by chemical means to prevent or retard electro-chemical action.

Soil Removal

Soil removal may be accomplished in several ways. Cleaning by means of petroleum solvents, emulsifying solvents and vapor degreasers are often used. A common, and incidentally a most economical, method is by means of aqueous solutions of alkaline compounds, either by immersion or through the use of various types of mechanical washing machines. These alkaline cleaners will remove oil and grease and, to a great extent, the solid matter. None of these methods will remove rust or scale. To remove rust and scale, pickling or sandblasting is employed.

Etching the Surface

Where pickling or sandblasting is resorted to, the surface will become rough or etched. When sulphuric or hydrochloric acid is used, the resulting chemical salts and



OFFICIAL U. S. NAVY PHOTOGRAPH

Hundreds of thousands of Navy 20 mm. ammunition boxes now wear a coat of Johnson's Wax-O-Namel. Why Wax-O-Namel rather than ordinary paints? Because makers of Navy ammunition boxes know that tough, hard-drying Wax-O-Namel more than meets Navy requirements *without* cost penalty. And in production, Wax-O-Namel assures trouble-free performance. It is easily and economically applied either by spraying or dipping. Cured either in conventional ovens or in infra-red drying banks.

The finish is uniform, hard, scratch-resistant, durable and rejects are practically unknown.

Hi-Bake Johnson's Wax-O-Namel is also used by manufacturers of such Naval equipment as galley desks, doors, officers' furniture, clothes lockers and the like. Perhaps Johnson's Wax-O-Namel . . . fine enamel impregnated with wax to provide extra protection through production and in service . . . can help solve *your* finishing problems. Write for the full facts. Do it now.

Back the attack . . . with more War Bonds

S. C. JOHNSON & SON, INC.
PRODUCT FINISHES DIVISION
Department IF-103
Racine, Wis.

acid will promote further rusting if not completely rinsed from the pores of the metal.

Surface Treatment

It is possible to secure a slightly etched surface and at the same time provide an insulating surface to retard electrochemical action. Phosphoric acid will etch and roughen the surface, but since the resulting salts are for the most part soluble in the acid solution, particularly those formed in strong acid solutions, the insulating coating leaves much to be desired.

There are proprietary materials on the market that produce water-insoluble coatings having various characteristics in crystallic structure, thickness and penetration. These processes not only provide insulating or rust retarding properties, but also a surface idea for paint adhesion. These surface treatments are applied in various ways, by brushing, swabbing, immersion in hot solutions, or by spraying in automatic conveyor-type washing machines.

Because of the needs of a quick, economical and efficient method of preparing ferrous surfaces for painting, there has been developed a proprietary acid type cleaning and surface treatment material designed primarily for use in spray type washing machines.

This material, possessing good wetting, penetrating emulsifying, and deflocculating properties, has the ability to clean and remove a wide variety of soil from steel. In most instances it entirely eliminates the need of precleaning to remove the oil, grease and dirt usually encountered. A one, two or three stage washing machine may be employed. The acid type cleaner may be used in all three compartments of the machine, or in the first and second stages, using the third stage as a rinse. Rinsing is not essential, as any light film of residue of the cleaning solution will in no way interfere with the adhesion of the subsequent paint.

The accompanying illustrations marked Figs. 1 and 2 show the

Fig. 1 (left)—Cold-rolled steel article (formed by spinning) as it appeared before being cleaned.

Fig. 2—The same article after cleaning in acid-type cleaner. Surfaces must be clean before being painted.

YOURS FOR THE ASKING!

WRITTEN FOR TODAY WITH AN EYE TO THE FUTURE

This magazine fulfills a real need in your product planning department and in your finishing department. It tackles wartime finishing problems from several important angles which will also prove helpful in the post-war era when competition becomes keen again. That is why you should send for "New Wrinkles in Finishing."

Billy Wrinkle Says

"WRINKLE will give any product eye appeal . . . surface protection . . . freedom from glare . . . resistance to the elements . . . all in a single operation."

NEW WRINKLE INC.

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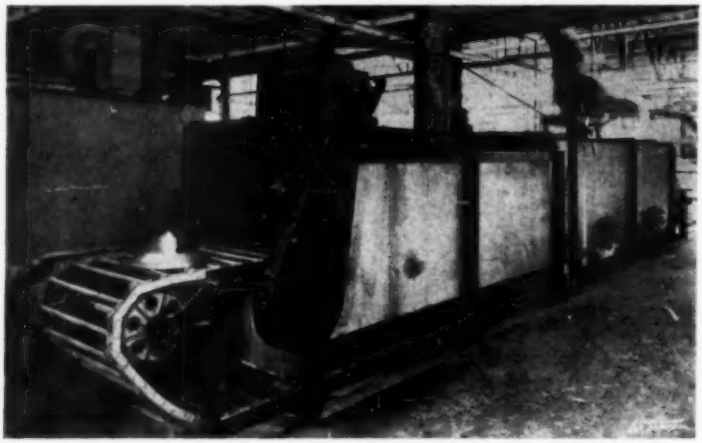


Fig. 3—This equipment includes a belt-type conveyor which carries the work through two compartments and a dryer.

merit of the acid cleaning in removing spinning compounds. Figure 3 shows a typical 2-stage belt-type conveyor washing machine. In this machine, the material is used at ½-oz. per gallon of water, the temperature of solution being 160° to 180° F. in the first compartment. A lower concentration at the same temperature is used in the second compartment. The work is exposed to the hot solutions for a total of two minutes. Following the cleaning operation, the work is dried by a hot air blast.

Precleaning Is Desirable In Some Few Cases

Where the accumulation of soil is extremely heavy, it is sometimes really advisable to resort to pre-cleaning. The choice of the pre-cleaning method depends upon conditions of the soil and/or equipment available. In such instances where a 3-stage washing machine is available, the following cycle may be employed to advantage:

1) Alkali wash in first compartment.

2) Spray rinse in second compartment where water is constantly changed to insure complete rinsing of the alkaline cleaning solution.

3) Spray wash in acid-type cleaner.

4) Dry in usual manner.

Although in this sequence of operations there is little need for cleaning, the acid-type cleaner is used to advantage because it provides a thin, crystalline, non-metallic coating which provides not only a good surface for bonding the paint film but also provides temporary rust protection.

The rust-resisting properties are such that they allow the work to be stored and remain in perfect condition for periods of time varying from several days to weeks, depending upon the atmospheric conditions in the individual plant.

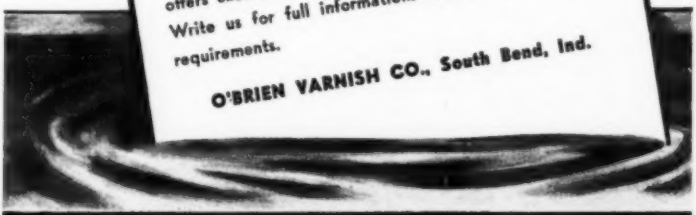
(to page 32)

O'BRIEN'S GRAY DIPPING PRIMER

A TRIED AND PROVEN STANDBY

Here is a metal primer that has proved itself through years of use in the toughest assignments in the automotive field. Used under government specification finishes (including lacquer and synthetic enamel) it will help you achieve dependable results in the finishing of your war material. It solves the problem of skinning and settling in the dip tank. It is salt-resistant, highly flexible and offers excellent adhesion to metal. Oleoresinous base. Write us for full information. Let us quote on your requirements.

O'BRIEN VARNISH CO., South Bend, Ind.



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Not the Most · · Just the Best

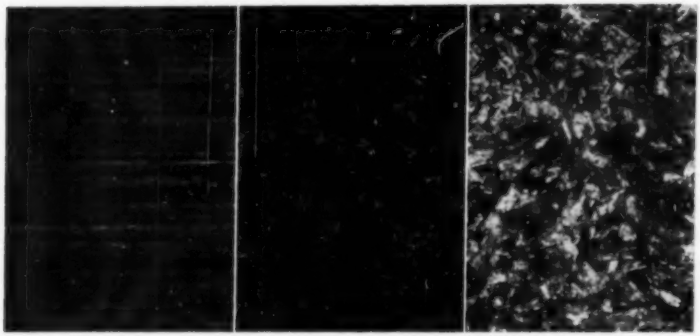


Fig. 4—These photomicrographs (each 60 diameters) show: A) untested cold-rolled steel; B) same steel after three minutes of exposure to an acid-type cleaner, at a temperature of 160° F.; C) same steel after being exposed to the acid-type of cleaner for as long as three hours at a temperature of 160° F.

Inasmuch as the material provides an excellent surface for painting, it is being used in plants where other methods of cleaning have been adopted.

A typical operation consists of removing the grease and oil by immersing the work in suitable alkaline cleaning solutions, rinsing thoroughly and then by immersing the work in the acid cleaning solution. The concentration of the solution is raised to 4-oz. per gallon of water, the temperature varying from 160° to 180° F. The elevated temperature increases the chemical reaction on the steel and aids in the drying operation.

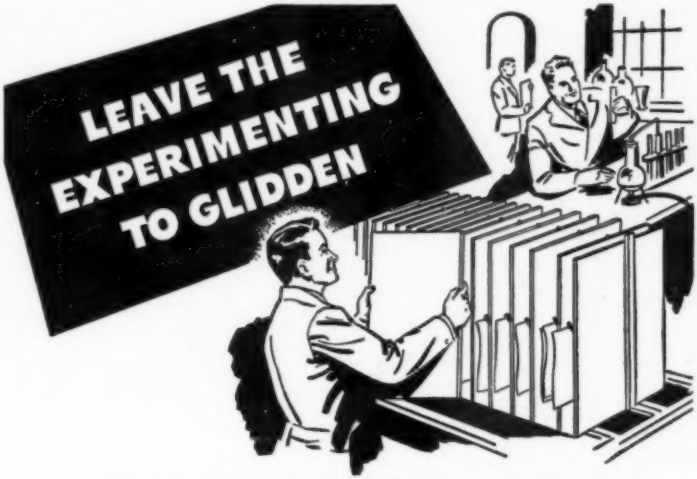
Acid-Type Cleaner in Metal Washing Machines

The photomicrographs marked *A* and *B* in Fig. 4, show the before and after effect of the acid-type cleaning material on a cold-rolled steel surface. The one marked *C* shows the typical crystalline non-metallic coating formed by the acid-type cleaner.

This acid-type cleaner may be used in all types of metal washing machines without fear of attacking the tanks, pumps, or any part of the unit in which the solution comes in contact. When steel is exposed to the acid cleaner, it undergoes an initial etch over which crystalline growth begins. After a period of time the reaction slows down and eventually ceases. This coating is insoluble in the cleaner, and no further reaction takes place. The illustration marked *C* in Fig. 4 shows a typical condition upon long exposure to the acid-type cleaner.

The material is supplied in powder form and has a pleasant aromatic odor. It is completely soluble and can be used effectively over a wide range of concentrations and temperatures. A simple titration method is employed in order to determine the concentration for upkeep purposes.

The material is being used successfully in a wide variety of metal plants manufacturing such items as ammunition boxes, bombs, projectile and many other products for war and civilian purposes.



Let the 8 Glidden Paint Laboratories work out Your Finishing Problems

• There's no need to take time from your production line to find the solution to your finishing problems—or to determine the performance of new wartime finishes. Your nearby Glidden Paint Laboratory can do your experimenting for you and keep your finishing line 100% on *output.*

Glidden's eight laboratories are constantly experimenting with all kinds of finishes. Being strategically located from coast to coast, they know how most finishes perform on products of all kinds, on finishing lines of all types and under all sorts of climatic conditions. And through their exchange of research and performance data, each Glidden laboratory has acquired an extremely broad knowledge of all sorts of problems and answers to wartime finishing.

Right now, Glidden may have a better finish for your war product—one that you can use with full confidence in its results. Why not see what Glidden has to offer you?

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Control of Quality in Our Aircraft Finishing

Process Engineering Manager of Douglas Aircraft Co., Inc., explains how to maintain a uniform quality control on every detail involved in the surface preparation and the painting of metal parts that enter into the construction of modern airplanes, which are now being turned out on a production basis. And what goes for airplane parts also applies to the painting of most other metal products.

BY W. D. CALDWELL

NOT SO MANY years ago, when airplane production was a relatively leisurely affair, faulty finishing was looked upon as a troublesome annoyance —a bit expensive at times, when extensive rework was involved, but seldom the cause for serious production delay.

Such Utopian days are now only a memory. Reworks are not only much more costly because of increased volume; they are intolerable if production schedules are to be met.

The Douglas Aircraft Co. has met the issue and, to paraphrase, "The Enemy Is Ours." The formula has been simple. *Specify and control.* Determine on satisfactory finish schedules and the best production technique, and then see to it that the specifications are followed *in detail.* It doesn't take more than average intelligence to see the logic behind this policy, yet the frequency with which finishing difficulties are encountered in many plants is eloquent proof that industry, as a whole, still has something to learn on this score.

Looking back, I see I've done a little back-slapping. Maybe I had better try to justify it and at the same time give some specific details about our control methods.

Note: The ensuing descriptions deal with finishing operations on a relatively large scale and in a plant where there are suitable laboratory facilities for complete and precise testing. However, some of the most basic controls are also the simplest to perform, and it is safe to say that no concern, regardless of size, is justified in eliminating all quality controls because of lack of equipment or time. A dollar wisely expended in prevention is worth the proverbial "pound" of cure, where the "pound" can easily run into considerable money.

Basic Phases of Control

Three basic phases of control may be recognized: Control of the package finishing material, control of its preparation for use, and con-

Deoxidine is a time tested phosphoric acid metal cleaner that removes rust chemically from pits as well as from the surface and at the same time destroys or neutralizes rust producers. Deoxidine also removes oil, light oxides, annealing scale, etc., eliminating in many operations the necessity for a separate pickling.

Deoxidine may be applied by dipping, spraying or brushing. There are various types of Deoxidine adapted to the several methods of application and to the cleaning of surfaces with varying amounts of rust and oil.

Deoxidine which introduced the new principle in metal cleaning as long ago as 1916, is a proved material and standard practice.

Write for Service Data Sheet.

Manufacturers of Inhibitors & Metal Working Chemicals

AMERICAN CHEMICAL PAINT CO.

AMBLER ACP **PENNA.**

Note—West Coast Plants may address inquiries and orders for prompt delivery to Lowe Finch, Ltd., 728 East 50th St., Los Angeles, California.

AMERICAN CHEMICAL PAINT COMPANY, AMBLER, PA.

Please send me general Technical Service Data Sheets on

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Company_____

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trol of its application, the latter including proper preparation of the surfaces to be painted as well.

Package Material

In general, package materials are purchased to meet a Government Specification. However, it should not be assumed that a paint's ability to conform to the requirements of a Government Specification is sufficient justification for releasing it into production without further check testing. There are workability and application factors of production that are not covered by Government Specifications, but which must be checked to insure satisfactory behavior. It is the practice of the Douglas Co. to check each incoming batch of paint for one or more of the following properties:

1) General package characteristics, such as grittiness, separation and skinning properties. (Visual examination suffices for such characteristics.)

2) Specific gravity (using a Gardner weight per gallon cup).

3) Viscosity (using a No. 1, 2 or 3 Zahn cup).

4) Drying time, color check and spraying characteristics. (Standard spray specimens are prepared and checked for color, drying time to touch and drying time to handle).

5) Settling rate (permitting the reduced material to stand in a graduate for a specified period and then determining the amount of settling of pigment and ease of remixing).

Basically, the foregoing factors suffice, along with the specification affidavits, to positively insure that only satisfactory materials are released into production. Of course, there are minor variations depending upon the type of paint and, in a few special instances, distinctive tests for such properties as dipping characteristics, baked-film flexibility, dope tautening, etc.

Preparation and Application of Material to Clean Surfaces

The material is prepared for use at one location within the plant, and the reduction ratios, which are used in thinning, are established uniformly for the entire plant, no variations being permitted. Most generally the reduction is made to a specified Zahn cup viscosity at 70° F. In a few instances it has been found more advisable to reduce on a volume

Spraying camouflage paint on fuselage.

YOUR TIME *is worth Money*

don't WASTE it

in your finishing department

USE protective coatings of proven merit, and reduce your finishing troubles to a minimum!

USE Walker finishes for best results.

Walker's chemists have developed Protective coatings that stand the pressure of unusual stress or strain—that protect against extreme weather conditions—that are flexible enough to meet unusual requirements—that adhere to all surfaces and meet government specifications.

To solve your war production painting problems, use Walker

PRIMERS • SURFACERS • LACQUERS
WRINKLES • SYNTHETICS

"Call on Walker"

H. V. WALKER CO.
Elizabeth, New Jersey
MODERN PRODUCTION FINISHES

percentage basis or a Baume gravity. In any event, the reduced material reaches production departments in the same condition day in and day out.

When workmen complain or want either a higher or lower viscosity material, they are instructed to adapt their technique to the material as prepared, rather than attempting to satisfy individuals with different mixes.

In the actual application of the material to parts and assemblies, equal attention is given to surface preparation and actual application conditions. It is pretty well known that *there are as many complaints, if not more, arising from improper surface preparation as there are from faulty materials and application procedure. Too frequently, however, this elementary fact is overlooked, with consequent production troubles which can never be quite pinned down as to cause.*

Let us consider the foregoing principles as applied to production parts. By and large, the real volume material at our plant is zinc chromate primer, of Government Specification P-2702. All aluminum alloy and magnesium parts receive at least one coat of this primer, whether or not they subsequently receive color lacquers or enamels. The primer is applied by one of three methods:

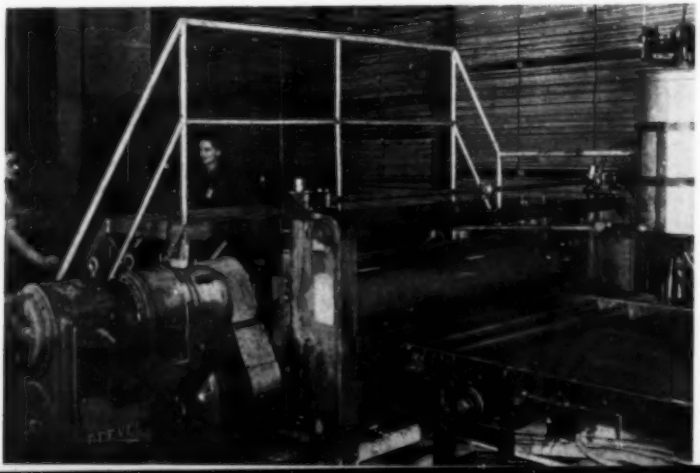
1) Roller Coating
2) Dipping
3) Spraying

Roller Coat Application of Primer

All hard aluminum coated alloy sheets are given a single coat of zinc chromate primer as raw stock. This includes Alclad 24ST and Alclad 24SRT. The sheets are uncrated. Rockwell-hardness tested, and immediately run through a progressive roller coating system which consists of a preliminary hot-acid etch, followed by a rinse and dry, and finally by the roller coat application of the primer.

The phosphoric acid type of etch used is essentially equivalent to

Application of primer to sheet stock is made on this roller coater, preceded by the phosphatizing treatment. Fast drying primer requires close limits of control to obtain suitable film thickness and leveling.



Finish with FLOCK

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The Versatile Material of Many Uses—

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SHOCK-ABSORBING-SURFACE

SIMULATING LEATHER, FABRIC, VELVET, PLUSH

Applied to metal, plastic, wood or paper, Rayco Flock is used to produce a variety of surface effects ranging from leather to velvet, in colors or white. Can also be used to apply decorative designs, as well as for functional uses such as insulation, sound-deadening, etc. We develop special styles to meet special requirements. Tell us your plans and let us offer suggestions.

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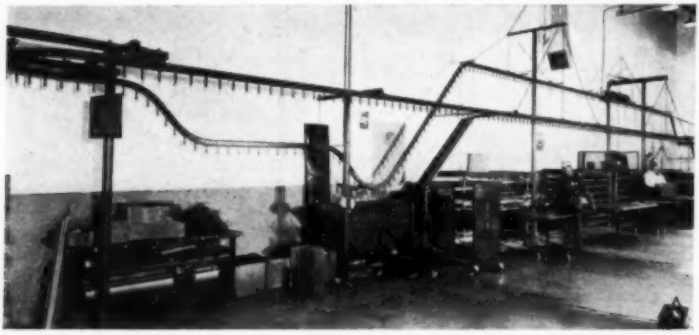
Developers and Manufacturers of Printing and Coating Flock



Dip tank conveyor circuit. The primer mix is supervised closely, and the conveyor speed is maintained within a narrow range.

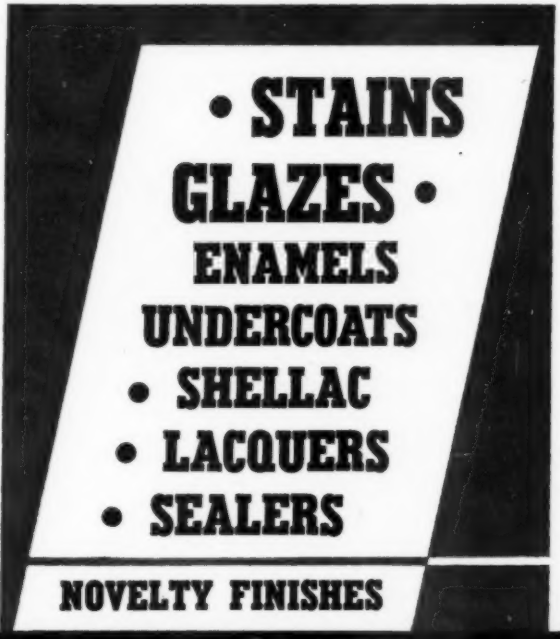
that specified in U. S. Army Specification 98-20007, paragraph V, 5b (2) but consists of phosphoric acid and butyl cellosolve instead of butyl and isopropyl alcohol, in aqueous solution. The function of this material is to remove very slight films of surface contaminants, such as oil and exposure scum, and to give the pure aluminum coating a "tooth" which is suitable for primer adhesion. At the same time it is essential that the sheet markings, as applied at the mill (which designate the type of material) be retained during this etching operation.

It has been found necessary to closely limit both the solution concentration, which is maintained between 2½% and 3% phosphoric acid by weight, and the operating temperature, which is between 160° and 170° F. The sheet stock passes horizontally through sprays which apply this etch; then on through a hot water rinse and squeegee rolls, after which it is dried by means of hot air blown on both top and bottom surfaces. The metal is then in the proper condition for application of primer. It reaches the coater rolls, farther along the belt tracks, when it is cool enough to take the primer.

Control Viscosity of Primer to Within Close Limits

For the actual application of primer it has been found essential to control the primer viscosity to within close limits, and also to see to it that precise settings on the roller spacings are maintained. Zinc chromate primer is fast drying and has poor leveling properties, consequently it is not a material easily applied by roller coating. In addition, it is necessary to maintain the coating thickness between .2 and .4-mils., the optimum condition for adhesion and protection.

It has been found possible, moreover, to control the applied film to such a degree that a very slight but characteristic veined appearance may be incorporated in the finish. This type of coating is deliberately produced as a means of identifying material that has passed through the roller coater. As a consequence, parts, no matter how small, that are cut from



IN STEP WITH THE TIMES

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that make the most of available raw materials to give you greatest durability, together with attractive appearance and economy.

• FOR APPLICATION BY ALL METHODS

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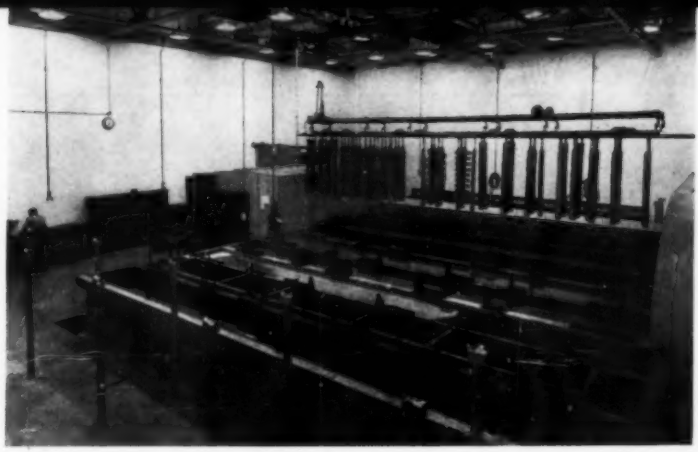

Combination anodizing and chromodizing sequence. Nine baths of cleaners, rinses, acids and drying oven are included in this process battery. Each operation must be accurately and frequently controlled for quality results.

the full sheets, retain their identity as stock that has previously been Rockwell-hardness tested and released into production. By this system, all subsequent Rockwell testing of individual parts fabricated from hard stock is eliminated—with considerable saving in labor.

Other factors in the roller coating operation, which require the overall close control, are the rapid drying time necessary to prevent driving-roll printing of the first coat prior to coating the opposite side, and the necessity for selection of a material that will permit the stacking of coated sheets shortly after their removal from the roller coater.

Surface Preparation for Primer; Anodizing; Chromodizing

Spray or dip application of primer to metal parts is preceded by a careful surface preparation. This treatment is dependent, of course, upon the alloy. For aluminum alloys, either one or two treatments is used—anodizing, or the so-called "chromodizing" treatment. The former is an electrolytic treatment, now widely known, and is substantially performed in accordance with Army-Navy Specification AN-QQ-A-696, whereas the chromodizing method is a straight immersion treatment in 5% chromic acid at 130° F., for a period of from two to three minutes. This process is described in U. S. Army Specification 89-20007, Paragraph V 5b (1).

The chromodizing treatment acts only as a preparation for subsequent primer application, whereas the anodic treatment also enhances the corrosion resistance of the aluminum alloys. However, the chromodizing treatment is generally preferred to anodic, because of its simplicity and rapidity.

The actual steps in both operations consist of a pre-cleaning in an emulsifiable solvent, which is then removed by a cold water spray rinse. No control over this process has been found essential. From there the work passes into a hot alkaline cleaner of the silicate inhibited type, which is maintained at 2 to 2½-oz. per gallon, at a temperature of from 160° to 180° F. Following this there is a

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Yarnall laboratories are working 100% on war coatings. Let them work for you.
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Industrial Division

hot water rinse from which the work proceeds to either the chromic acid solution of the chromodizing process, or into the anodic electrolyte, which is 6% in chromic acid, maintained at 95° F.

In the case of the anodic process, it is essential to maintain a close control over the free chromic acid concentration and temperature, as well as the time of treatment (30 minutes at voltage) and the anodizing voltage, which is 40 volts, plus or minus ½-volt. The aluminum alloy parts are then rinsed in clean hot water and dried in a hot air re-circulatory oven at 220° F., for about ten minutes. This latter temperature has been established as a maximum permissible for rapid drying that will have no deleterious effects on the hard aluminum alloys, which are made susceptible to inter-granular corrosion when subjected to excessive temperatures for prolonged periods.

From the time the material is dried until it receives its spray application, or dip coat, it is never handled by soiled or greasy hands. Most of the handling is done on tray carts, in tote baskets, or by workmen wearing clean gloves. Contamination of the surfaces must be maintained at a minimum.

Magnesium Alloy Preparation for Paint

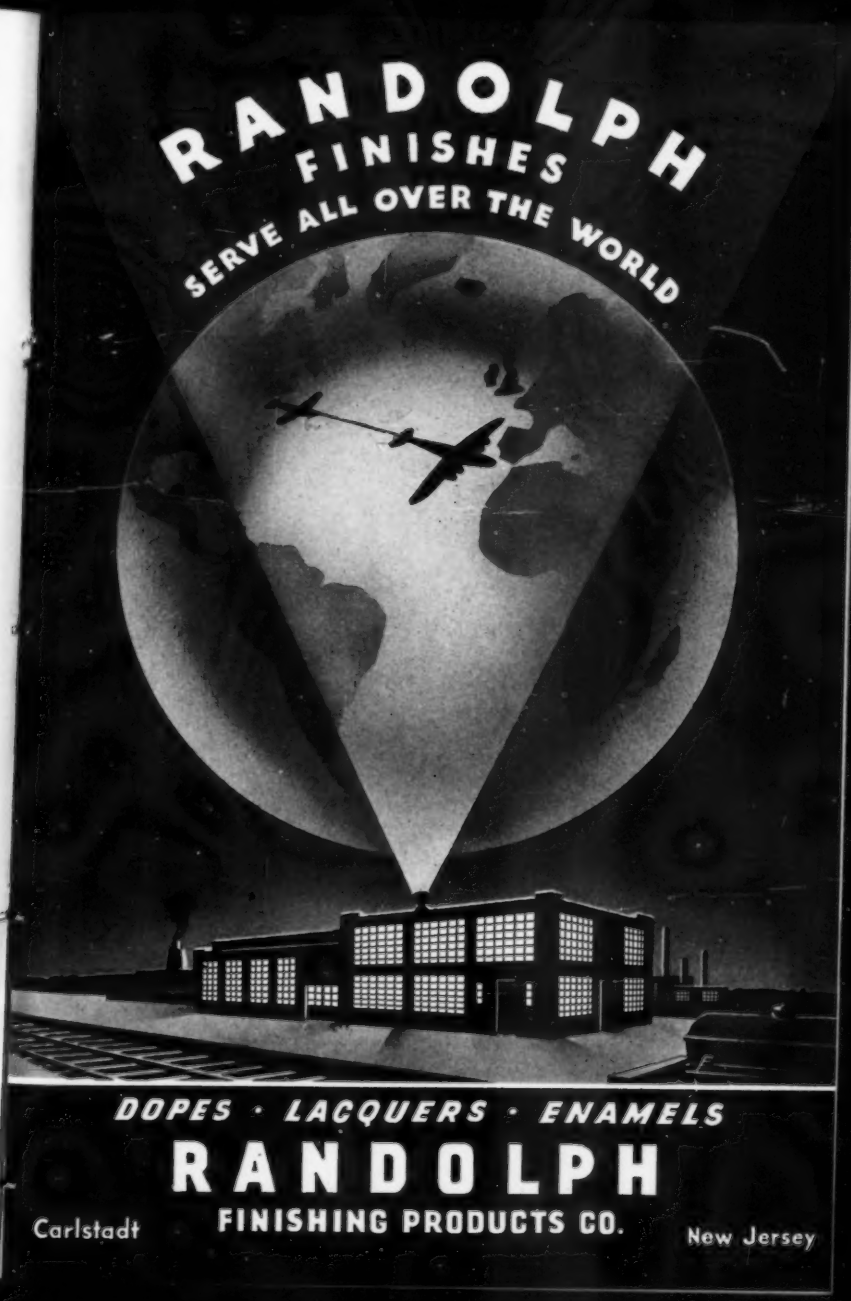
Magnesium alloy parts are prepared for paint by one of two methods—either the chrome pickle (Dow No. 1 Treatment) of U. S. Army Specification 98-20010-B, paragraph E-3A, or the dichromate treatment (Dow No. 7 Treatment) of the same Specification, paragraph E-3B. The former method is used only on extrusions, sheet, plate and strip, whereas the latter is applied to castings, forgings and machined products, provided they are not of Dowmetal "M" (American Magnesium AM3S) which is not susceptible to the Dichromate treatment.

Chrome Pickle (Magnesium)

The chrome pickle operation is relatively simple. Parts are generally sufficiently clean to be given the direct immersion into the chrome pickle etch, which consists of 1½-pints of concentrated nitric acid and 1½-lbs. of sodium dichromate per gallon of solution, used at room temperature. The character of the coating obtained in the normal 30 to 90-second etch is more dependent upon the age of the pickle than any other factor, except perhaps elevated temperature; and it has been found sufficient to train operators to recognize the character of a satisfactory coating. Frequent checks, however, are made of the chemical composition of the pickle, which may be replenished three or four times before being discarded.

Dichromate Process

The Dichromate, or No. 7 process, is more critical than the chrome pickle treatment and, at the same time, it is susceptible to more accurate control. The first step (which cannot be eliminated) is an alkaline cleaning operation, which serves both to clean the surfaces of grease and dirt, and also to remove the chrome pickled condition of the parts as they are received from the forge or foundry. An alkaline cleaner is employed at a strength of about 6-oz. to the gallon, at a temperature of about 160° F. Fairly frequent checks are made of this bath, since it is absolutely essential that the work be completely clean before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the chemical treatments of the process which follow. After cleaning, there follows a hot water rinse. The parts are then cooled in fresh water and immersed in hydrofluoric acid concentration 15% by weight, at room temperature, for a period of five minutes. This is succeeded by a cold water rinse, a hot water rinse, an immersion in a hot (195° F.) solution of sodium dichromate in water, 10% by weight, for a period of 45 minutes. Both the temperature and the concentration of this bath must be checked frequently and maintained within close limits. Also, periodic checks are made for any possible carry-over of hydrofluoric acid into the solution, since fluoride ions frequently will cause spotty and uneven coatings. The final steps are simply a hot water rinse and a hot air dry. The parts themselves are handled with the same care as is exercised in the case of aluminum alloy parts.

Dipping Technique

Dipping operations for application of primer require a control of the material viscosity and a precise determination in the case of automatic units of the rate of pull-out, in order to obtain a coating without sags and runs, yet with suitable production rate. It is also necessary to be sure that the primer used will not settle out into a hard cake during periods of idleness of the dip tank, when the agitator is turned off.

In full production, it is necessary to make frequent checks on the dipping material viscosity because of the rapid evaporation of the solvents used. Further, the reducing thinner must be so selected that its ingredients are not susceptible to selective evaporation, for, over a period of time, such a condition would result in an unsatisfactory solvent with either poor drying characteristics or inability to hold the primer vehicle in solution, or both.

Spraying Technique

In the actual application of the primer by spraying, it has been found sufficient to control the viscosity of the sprayed material and the pressure applied both at the pressure pots and the spray guns. Beyond this point the spraying quality is dependent upon the skill of the operators and becomes the responsibility of the various lead men and supervisors to see that the workers are properly instructed as to spray gun adjustment, distance of nozzle from work, speed of fan, maintenance of clean guns and equipment, etc. It is not practicable to closely control the thickness of applied primer since, being such a thin coating, it is practically impossible to specify conditions of application that would result in coatings of the desired thickness.

Lacquers and Enamels

Controls that are applied to the application of colored lacquers and enamels are essentially the same as described for primer. However, one point worth noting is the method of cleaning primed surfaces which have stood for a week or more before receiving their final lacquer or enamel coating. Frequently these parts have been handled and worked upon and require moderate cleaning to insure satisfactory adhesion of the final coats. For this use, the Douglas Co. has formulated and prepared a wash thinner specification in order to obtain efficient cleaning with not too great danger of re-

Making cans of paper board saves vital war material. But in coating these cans to make them paint-proof, trouble cropped up—they leaked at the seams. The job was put up to Paasche engineers. Tests showed that **aircoating** the interior of the containers with molten wax would overcome the trouble. A unit was designed and built to apply the heated wax automatically. Now paper "cans" are rolling off the conveyor of the Paasche aircoating unit at the rate of 3600 per hour!

The coating applied to the interior is perfect and uniform; the seams are sealed and leaks are a thing of the past. Another troublesome coating job has become routine production with Paasche equipment.

Containers, closures, ammunition boxes, shells, shell cases, bombs, grenades, fuse gears, metal sheets—these are only a few of the many products coated by Paasche automatic and special equipment.

Whatever your finishing problem, Paasche can help you achieve maximum production, improve quality and conserve materials. Our engineers are at your service, without obligation. Call on Paasche.

PAASCHE AIRBRUSH CO.
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Paasche AIRPAINTING EQUIPMENT

Manual, automatic and special airpainting equipment, airfinishing booths, pressure regulators, airconditioners for compressed air lines, air dusters and stripers.

moval of the primer coat itself—and, at the same time, to insure that no high-boil solvents could remain on the primed surface and not evaporate before the final painting.

Summary of Revealed Information

To summarize the foregoing, it is sufficient to state that there are two distinct requirements for obtaining quality aircraft finishes. One is the specifying of materials and technique, and the other, the establishment of controls (to fixed standards) which will insure rigid adherence to the specification requirements.

The Douglas Co. has watched the diminishing of its finishing troubles over the past few years, while production rates have steadily increased. This desirable trend is attributable directly to the recognition of the necessity for and the application of a policy of strict quality control. It is not too much to say that this same policy could be successfully and economically applied in many industries which now look upon finishing "headaches" as a necessary evil. They are an evil, but definitely not necessary.

Carl G. Strandlund Appointed V. P. of Chicago Vitreous Co.

Recent announcement from the Chicago Vitreous Enamel Product Co., Cicero, Ill., tells of the appointment of Carl G. Strandlund, formerly in charge of their armor-plate division, to the office of vice-president and general manager. Prior to his service with Chicago Vitreous, Mr. Strandlund had been a nationally known consulting engineer.

Army-Navy "E" Award Again for Ferro Enamel Corp.

Producers of numerous essential war materials, the Ferro Enamel Corp., Cleveland, Ohio, recently received its second Army-Navy "E" award for continued production excellence.

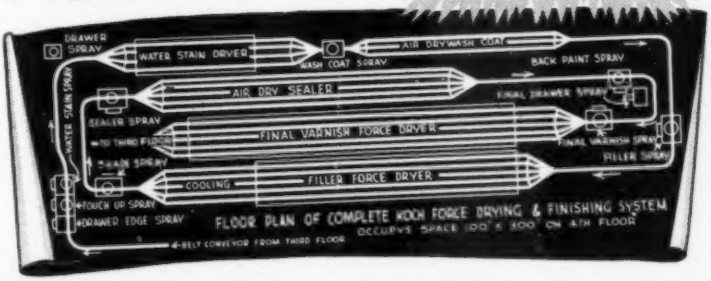
Under Secretary of War Robert P. Patterson, in informing the organization of the award, paid tribute to the "high standards that . . . won you distinction more than six months ago" and have been fully maintained since that time.

Internationally known for its research, new product developments and advanced engineering practices in the porcelain enameling field, the Ferro organization has made several important technical contributions to the war effort, some in fields far removed from its regular business.

While extremely proud of the white star that has been added to their "E" flag, and while continuing to expend every possible effort on war production, Ferro's executives are also thinking and planning ahead for peace. Not only are they getting their own house in order, with several vastly improved products now ready for production, but they are assisting many of their customers to make tangible plans for reconversion, so no time will be lost returning to peace-time production.

In a simple ceremony, in keeping with the War Department's wish, representative employes and executives of the Ferro Enamel Corp. dedicate a new Army-Navy "E" flag with white star at the company's Cleveland plant.

PRODUCTION UP TO 900 UNITS A DAY!



Another Example of How You Can Speed Up Production

WITH KOCH FORCE DRYING AND FINISHING EQUIPMENT

Designed for a nationally known maker of cedar chests . . . with a goal of 600 units a day . . . this KOCH Force Drying and Finishing System has produced up to 900 chests a day! The above diagram shows how the chests come up from the final assembly room . . . are carried through 11 finishing and 5 drying operations continuously . . . and then conveyed down to the rubbing and packing room ready for delivery.

The main air distribution and conditioning system for the dryers is installed in a penthouse on the roof. Accurate temperature and humidity control is maintained automatically regardless of outside weather conditions.

The success of this important installation is just further proof of KOCH's thorough understanding of wood finishing and drying problems. Let them make a study of your plant and product and recommend the equipment you need to step-up production!

Five lanes of chests passing from the Filler Drying Unit ready for the next Spray coat.

Newly assembled chests receiving their first finish. Note the turntable section in the conveyor track.

For Complete Information, Phone, Wire or Write Today.

GEORGE KOCH SONS, INC.

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PROTECTING THE RUNWAYS TO JAPAN!

OFFICIAL U. S. NAVY PHOTO

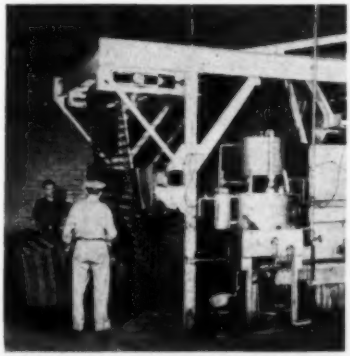
Laying steel landing mats at an advance army air field

Facing severest conditions from Attu to Guadalcanal, these landing mats must have the greatest protection possible. Lives depend on their life . . . their durability. Sherwin-Williams "Plus" Finishes are the sturdy protectors of these runways to Japan.

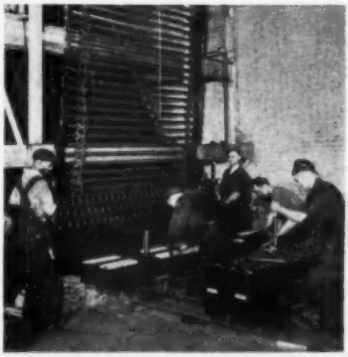
To Empire Plow Co. of Cleveland, Ohio, J. S. Thorn Company of Philadelphia, Pa., Metallic Vault Co. of Galion, Ohio and to other plants converted to the making of these ingenious landing mats, Sherwin-Williams is furnishing the finest of protective finishes.

SHERWIN-WILLIAMS

FOR THE ANSWER TO ALL INDUSTRIAL OR WARTIME FINISHING QUESTIONS



CONVEYOR FINISHING SYSTEM at Empire Plow Company plant. Conveyor carries mats through a degreasing tank into a dip tank up through a drying oven.



UNLOADING FINISHING CONVEYOR. Mats coming from finishing oven are wired in 6 bundles of 5 mats each. Bundles are then loaded by crane into freight cars.

Empire Plow Company Gives "PLUS" Protection to Steel Landing Mats

● They "beat their plows into landing mats"! That called for a complete plant conversion involving new tools, new and accelerated production methods.

So well did Empire Plow Company swing over from plows to "portable airfields," that production was streamlined from 40 to 7 operations!

Sherwin-Williams Industrial Finishes are doing their part in speeding-up Empire Plow's finishing operations. Special finishes were formulated to fit this particular job that enabled Empire Plow to turn out highest quality jobs at lowest possible unit cost.

Whether you need finishes or simply want advice about them—get in touch with Sherwin-Williams FIRST. You'll save yourself time and trouble. You'll get the right answers quicker, the right paints sooner! Write, wire or phone us TODAY.

INDUSTRIAL FINISHES

WRITE, WIRE OR PHONE THE SHERWIN-WILLIAMS COMPANY, CLEVELAND, OHIO

Here is my article on the use of alkyd resins in specification finishes. I believe that many users of alkyd resin coatings will concur in my statement that these finishes probably furnish the best combination of properties desirable in industrial and production paints.—

M. A. Glaser

THE WHY OF ALKYD RESINS IN *Specification Finishes*

BY M. A. GLASER

Chief Chemist, Standard Varnish Works (Chicago Plant)

USERS of modern protective and camouflage paints for all war finishes have undoubtedly noticed that many of these materials employ the familiar alkyd resin as the binder. Although usually denoted by the term "alkyd," these resins are also knows as glyptals, rezyls, glyceryl-phthalate resins, poly-hydroxyl alcohol-polybasic acid resins, and by that vague and unsatisfactory expression "synthetics."

These resins are most commonly made from the familiar glycerine, a white crystalline material known as phthalic anhydride and one or more modifying materials, such as rosin, vegetable oils (linseed, soya, castor, etc.), fatty acids, phenolic resins and many lesser known chemical raw materials.

The origin of the resin ingredients is interesting. Glycerine is normally a by-product of the soap industry, although some has recently been synthesized on a commercial scale from petroleum. Phthalic anhydride is derived from coal. The sources of rosin and the oils mentioned are well known. Although made from simple basic materials, a great deal of chemical skill is required to carry out the reactions involved in obtaining good, useful alkyd resins.

Examination of a few finish specifications will serve to demontrate the outstanding properties of coatings prepared from the proper alkyd resins.

Army-Navy. In specification AN-TT-E-501, heat-resisting black enamel, the alkyd-base material must withstand four hours immersion in gasoline, and ten minutes immersion in boiling water. The enamel film must be capable of being heated for 24 hours at 500° F. without decomposition and must, in addition, pass an aging test and a severe flexibility test made at the freezing point of water.

Spar varnish AN-TT-V-116 is required to meet the gasoline and boiling water resistance requirements of AN-TT-E-501 and a

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Help speed the day of victory . . .

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Chicago 14, Illinois

similar flexibility requirement. This alkyd-type spar varnish must also possess weather resistance of at least one year actual outside exposure.

U. S. Maritime Commission. Low visibility gray eggshell paints for ships, specification, 52-MC-5, must resist water during an 18-hour constant immersion test and must pass a severe flexibility or bending test.

U. S. Army Quartermaster Corps. ES No. 365, heat-resisting motor gray enamel must successfully pass the following immersion tests:

1) Gasoline for 24 hours.
2) Cold water for 24 hours.
3) Boiling water for 15 minutes.

Among other things, this alkyd enamel must also withstand heating and flexibility tests.

JQD No. 144, baked coatings for equipment hardware, Type II, must be made with an urea-resin modified alkyd finish. This finish must pass the following severe tests:

1) Immersion in a petroleum solvent for 16 hours.
2) Immersion in cold water for 24 hours.
3) Immersion in boiling water for 15 minutes.
4) Exposure in a weatherometer for 150 hours.
5) Exposure in 20% salt spray for 150 hours.
6) Exposure in saturated steam at 17-lbs. per sq.-in. pressure for 30 minutes.
7) Exposure to 0.1N hydrochloric acid for 72 hours.
8) Exposure to 0.1N caustic soda for 72 hours.
9) Exposure to 0.1% available chlorine for 72 hours.
10) Bending 90° around a ⅛-in. round rod—a very severe bend.

U. S. Army Ordnance. TAC ES-680a, protective coating materials, is one of the most frequently used finish specifications. These cover a large variety of finishes. Metal primers, surfacers, enamels (gloss, semi-gloss and lusterless), wrinkle finishes and wood sealers prepared to meet the conditions of these specifications may all be made from the appropriate alkyd resin. This series of finishes must withstand the action of gasoline and water in tests similar to those described before. The lusterless enamels are required to maintain low gloss and sheen after being subjected to exposure and rubbing tests.

AXS-750, synthetic rust-inhibiting primer, and AXS-755, heat-resisting enamel, are typical of a large group of coatings based on an alkyd resin vehicle. Durability requirements resemble those already described.

Bureau of Ships. Alkyd resin 52-R-13 is the basis for many paints made for this department. Durability requirements are such as have been previously considered.

U. S. Army Air Forces. No. 14118, aircraft decalcomania, in addition to passing the customary water resistance and flexibility tests, is required to withstand an accelerated aging test of seven cycles, and to have a durability of at least six months summer exposure.

No. 14120, camouflage enamel for steel containers, must resist solvents, water and vegetable oil, as well as outdoor exposure.

U. S. Army Corps of Engineers. T-1103B olive drab enamel and T-1599-lusterless enamel. Both of these materials must pass water, gasoline, flexibility and weatherometer tests. *(to page 58)*

How Paint Protects America's Firepower

Superior firepower and the world's best gunners have enabled America's tanks to go into enemy territory and emerge victorious. Yet these magnificent gunners must have equipment that transmits their thoughts into the fluid, unbroken movements of their guns.

For example, when the turret gunner swings his guns into position on target, he manipulates two levers which actuate a hydraulic unit and control the position of the turret.

Lowe Brothers supply a special paint which is used on the inside of these hydraulic units. Its function is to protect the interior of this unit from corrosion. In doing this, it must stand up under the abrasive action of hot oil which constantly circulates within it. Were this paint to chip off, oil lines might become fouled and the entire hydraulic unit would be useless.

Supplying paint which protects America's firepower is just one of the many ways which Lowe Brothers broad experience with U. S. Government Specification Finishes is serving our war effort. So if you have a problem on industrial finishes of any type, perhaps we can serve you as we serve so many others.

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THE LOWE BROTHERS CO.
DAYTON, OHIO

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WARTIME FINISHES for Industry
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The Case of the Saggi

WRITE OR WIRE THE DU PONT WAR SERVICE MEN (R M

☐ *How to speed output and save materials*

Handy pocket-size, fully illustrated booklet, *"Hints on Wartime Finishing Economies."* Shows you 11 points to check for greater efficiency and speed on your war contract finishing schedules.

☐ *How to meet emergencies and solve problems*

Check here for the help of Du Pont War Service Men—skilled "trouble shooters" to straighten out "kinks" in your finishing system *before* or *after* the trouble occurs. Their "know-how" is at your disposal on any war contract finishing. Write about your trouble. Or wire in case of emergency.

agging Finish

Or How a Du Pont War Service Man Gave a High Explosive Projectile a Blow-Out

YOU may agree to meet a set of finishing specifications, but it's often very difficult to stay within them. Especially when production quotas must be filled on an around-the-clock basis.

A typical example is the shell manufacturer who ran into an unusual finishing problem. Certain explosives react unfavorably with the metal inside a projectile. So the interior is sprayed with a special finish. As the spray nozzle is lowered through the fuse hole, the projectile revolves. Thus, a uniform coating is applied. Or should be!

In this case, though, bare spots appeared on the interior wall . . . the finish ran down the sides and formed puddles at the bottom. Nothing they did would make the coating set properly. So, they called in a Du Pont War Service Man.

A specialist on finishing problems, he recognized the difficulty almost at once. The solvent vapor, heavier than air, stayed inside the projectile. This solvent "lock" had prevented drying, causing the finish to sag and run.

He suggested installing two small air jets over the conveyor. These would blow air into the interior of each projectile and remove the solvent vapor. His suggestion was followed, and their troubles were over. The finish set up promptly, producing the desired uniform coating.

Once again, a Du Pont War Service Man serves industry and his country. His authoritative knowledge of finishing problems makes him a good ally to have around. Enlist his aid whenever trouble appears.

E. I. du Pont de Nemours & Co. (Inc.), Finishes Division, Wilmington, Del.

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Alkyd-Resin Finishes Have Variety of Uses

The specifications referred to are intended to be typical of many which may be based on alkyd resins. This class of synthetic resins is used in many of the high grade lacquers for war work, in non-specification paints for purposes of war, and in some adhesives as well. Alkyd resins provide the paint formulator with an excellent and most versatile group of tools with which to prepare suitable finishes for war time and for peace time as well.

Other synthetic resins, such as phenolics, the vinyls, the acrylics, the ureas, the polystyrenes, the hydrocarbon types, the terpene base, the cumars, and even many natural resins are in certain cases preferable to alkyd resins.

The wide acceptance of alkyd-resin finishes by the government agencies, after long study, indicates without much doubt that, in most cases, these coatings provide the optimum combination of properties for the largest number of protective, decorative and camouflage coatings. Finishes made from the proper alkyd-resin bases possess excellent adhesion to most surfaces, good color retention and excellent weathering characteristics. They have hardness, flexibility, moisture and solvent resistance. They withstand the action of many reagents and show little change in gloss, even after long exposure periods. Many require reduction with only inexpensive thinners.

With the host of new chemicals that will be available to the manufacturers of alkyd resins after the war, we can reasonably expect that the paint-consuming industries will enjoy the use of more and better alkyd resins in the days to come.

Wartime Wood-Finishing Problems

IT HAS been almost two years since America entered World War II, and since then many changes have taken place in the wood-finishing industry. Great problems have faced both manufacturers and users of finishing materials. Some of these problems have been so serious that they seemed almost insurmountable — but, through the co-operation of both the producer and the user of finishing materials, most of us have been able to get along.

While it is almost impossible to obtain the prewar type of finishing materials, there are a lot of substitute materials still available. Although these substitutes do not produce as good a finish as the prewar materials they have replaced, we can, by rearranging our finishing schedules, turn out a finish that is reasonably satisfactory.

Substitute Shellac

Substitute white shellac (which has replaced white shellac) cannot, in every instance, be used just like white shellac, but it can be made to serve the purpose in most cases. It cannot be used as a sealer under lacquer, but it can be used as a sealer under varnish; and it also makes a satisfactory wash coat. While it requires a little longer to dry than white shellac, most substitute shellacs produce a tougher film than pure white shellac.

Wartime Wood Fillers

Present-day wood fillers are not as good as the prewar fillers, due to the type of oils that have to be used in them now. This is especially true of the quick-drying and forced-dry fillers, but by allowing them more time to dry most of them will give good results. *(p. 60)*

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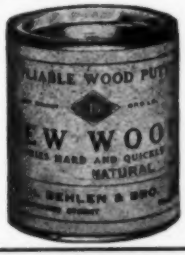

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Substitute Lacquer Sealers

At present, lacquer sealers and lacquers are available in only very limited quantities, due to Government restrictions on lacquer thinners. But there are some fairly good substitute lacquer sealers on the market. These substitute sealers require more drying time, but they do produce satisfactory results if used properly. (I understand that there will soon be an alcohol cotton type sealer on the market. This sealer will dry and sand as good as lacquer sealer, as I understand it.)

Varnish Top Coats

As to top coats, since lacquer is not available in quantities to meet present production needs, most finishers have turned to varnish as a top coat. While in most cases the varnishes now available are not as good as the prewar varnishes, due to the restricted use of glycerine and tung oil, there are several good varnishes on the market. Although they do not, in some cases, produce as tough a finish as lacquer, they are proving to be all right. This is especially true of the water-resistant and alcohol-proof flat and gloss varnishes. They require a longer time to dry than lacquer, but we can arrange our schedules so we can use them.

Wood Stains

Non-grain-raising stains are harder to get, but we can go back to our old water stains and, by forced drying, we can keep the same production schedule that we were using with non-grain-raising stains.

Most wood furniture manufacturers are unable to obtain top grade veneers, as most of the veneers now available are of a poorer quality and some of them, such as striped walnut and mahogany, are almost unobtainable. To overcome this condition it is necessary to readjust the stains, as in some cases there may be three or four different colors of veneers on the same piece of furniture. Then, in some of the low grade veneers, there are dark mineral streaks, knots, etc. In order to cover these it is necessary to use a uniforming enamel of the proper color.

In this article I have mentioned only a few of the many problems in the wood-finishing industry, and some of the different ways and methods that are being used to solve them. I am sure that more difficulties will arise but I feel confident that they will be overcome just as those before them, as this is the spirit that will lead America to final victory in this great war.
—H. W. CHESTER.

Glyco Products Co. Appoints Plant Manager

Mr. Louis L. Shapiro has been appointed plant manager of the Glyco Products Co., Inc., Brooklyn, N. Y. Mr. Shapiro is a graduate chemist and for the past 14 years he has served as chief chemist and director of chemical and research work for a large eastern concern.

Schneible Offices Moved to Detroit

The Claude B. Schneible Co., engineers, designers and manufacturers of dust, fume and odor-control equipment, has for a number of years maintained its engineering, sales and general offices at 3951 Lawrence Ave., Chicago, Ill. More recently, manufacturing facilities were acquired in Detroit, Mich.

Effective September 1, the plant at 2827 25th St., Detroit, became headquarters for the organization. Engineering, sales and production activities are now consolidated at Detroit.

Branch offices are unaffected. A sales office will be maintained in Chicago, located at 4554 N. Broadway.

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Finishing Masonite

FLUORESCENT LIGHTING REFLECTORS

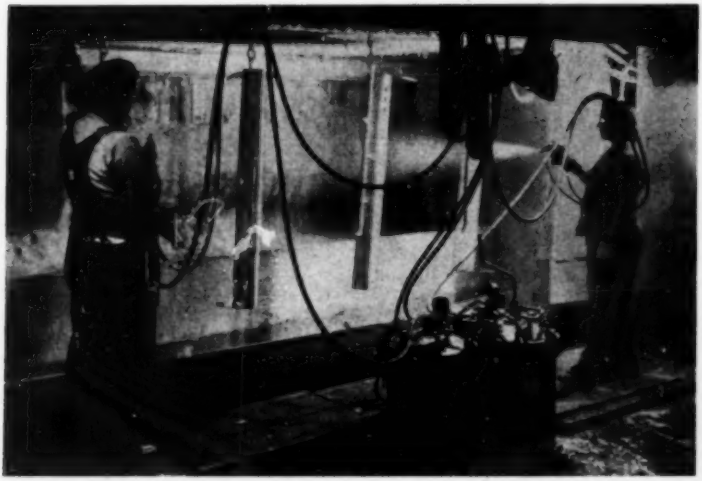
BY C. J. FRANCIS

AS A WAR substitute for sheet steel fluorescent lighting reflectors finished with vitreous enamel, the Edwin F. Guth Co. of St. Louis, Mo., is making these reflectors of Masonite and finishing them with baked synthetic enamel. This company has taken a leading part in developments in the art of lighting for nearly two generations, and the manner in which it has met the present war emergency so successfully, is in keeping with its ability to progress in times past.

Characteristics of Masonite

Masonite, a ligno-cellulose hardboard, was selected after careful investigation as a suitable nonmetallic reflector material to meet wartime shortages of metals. This selection was made on the basis of a material that would take a durable, efficient finish on its reflecting surface, as well as for strength, etc.

Among Masonite's physical characteristics are those making it possible to form the material into the desired reflector shapes in presses,



Fluorescent reflectors pass through spray booth by overhead chain conveyor.

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its great hardness and density, the fact that it is smooth and of even texture, and it is moisture resistant. It is a non-conductor of electric current, non-inflammable and, when once formed, it holds its shape. Masonite takes an enduring finish of the required quality for reflecting light. This reflecting finish, as used by Guth, is known as "300° white," and consists of a baked synthetic enamel that provides a high gloss of great permanence.

The Masonite board used for these reflectors is ⅛-in. thick. It is very light, weighing only 5½-lbs. for the 40-watt fluorescent lamps and 9½-lbs. for the 100-watt size. It is not affected by the dryness or moisture encountered under ordinary conditions in industrial plants.

The particular type of Masonite now used by this company is received in pre-tempered condition. This tempering is done at the mill. It consists of impregnating the fibrous hardboard with a specially selected oil and baking the material at a high temperature. Since the oil does not have a petroleum base it does not work up into enamel finishes during the life of the reflectors. Oil tempering is very important for securing the best possible finish later, because it increases the resistance of the board to the oil fumes and other vapor normally met with in an industrial plant atmosphere.

Sealer Coat Applied and Baked 20 Minutes at 270° F.

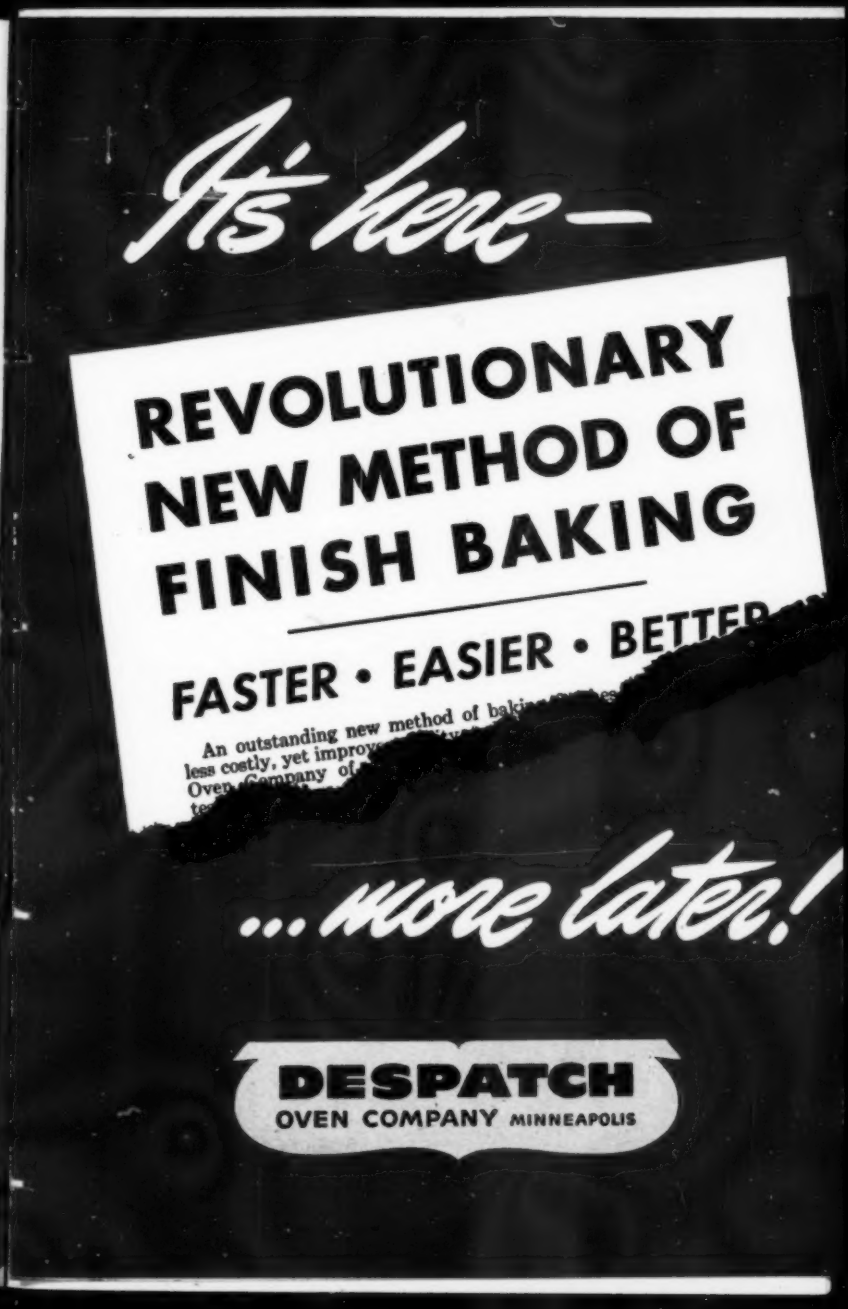
The formed reflector first receives a sealer coat. This is similar, as to purpose, to the priming coat used on wood products. Both sides and the edges are given this treatment, special attention being given to thoroughly saturating the edges, which are more porous. The material used for this sealer coat is resilient and accommodates itself to the flexible character of the base material, Masonite. It is a special mix, and is applied by spray guns.

After both sides of the reflectors have been properly sprayed they are placed in racks on a conveyor. These racks are designed to hold the reflectors in such a way as to permit an extra brush application of sealer to the edges as the reflectors move along. This is done because Masonite edges absorb the sealer coat very readily, which makes the supplementary brushed-on coat highly desirable in order to secure the best possible final finish and appearance. The sealer coat is baked at a temperature of 260° to 275° F. for 20 minutes.

Finish Coats; Outside Gray; Inside White; Baked

Next, the finish coat is applied. Exteriors of the reflectors are given a covering of high-bake Industrial Gray Enamel. The reflecting surfaces are covered with the "300° white" synthetic enamel. A double heavy coating of the latter is sprayed on in water-wash spray booths. Before baking in an oven, the reflectors are passed to a second booth where more white enamel is sprayed on to give the required heavy thickness and to make sure that the coating is uniform over the entire surface. Spray gun nozzles are cleaned every four hours to insure proper operation and efficiency. This double application of enamel before baking gives added depth and richness to the final finish so that it closely resembles the fullness and whiteness of clean white porcelain enamel.

The oven, with its automatic temperature control, is provided with indirect draft ducts which supply heated and filtered air for the enamel baking process. It is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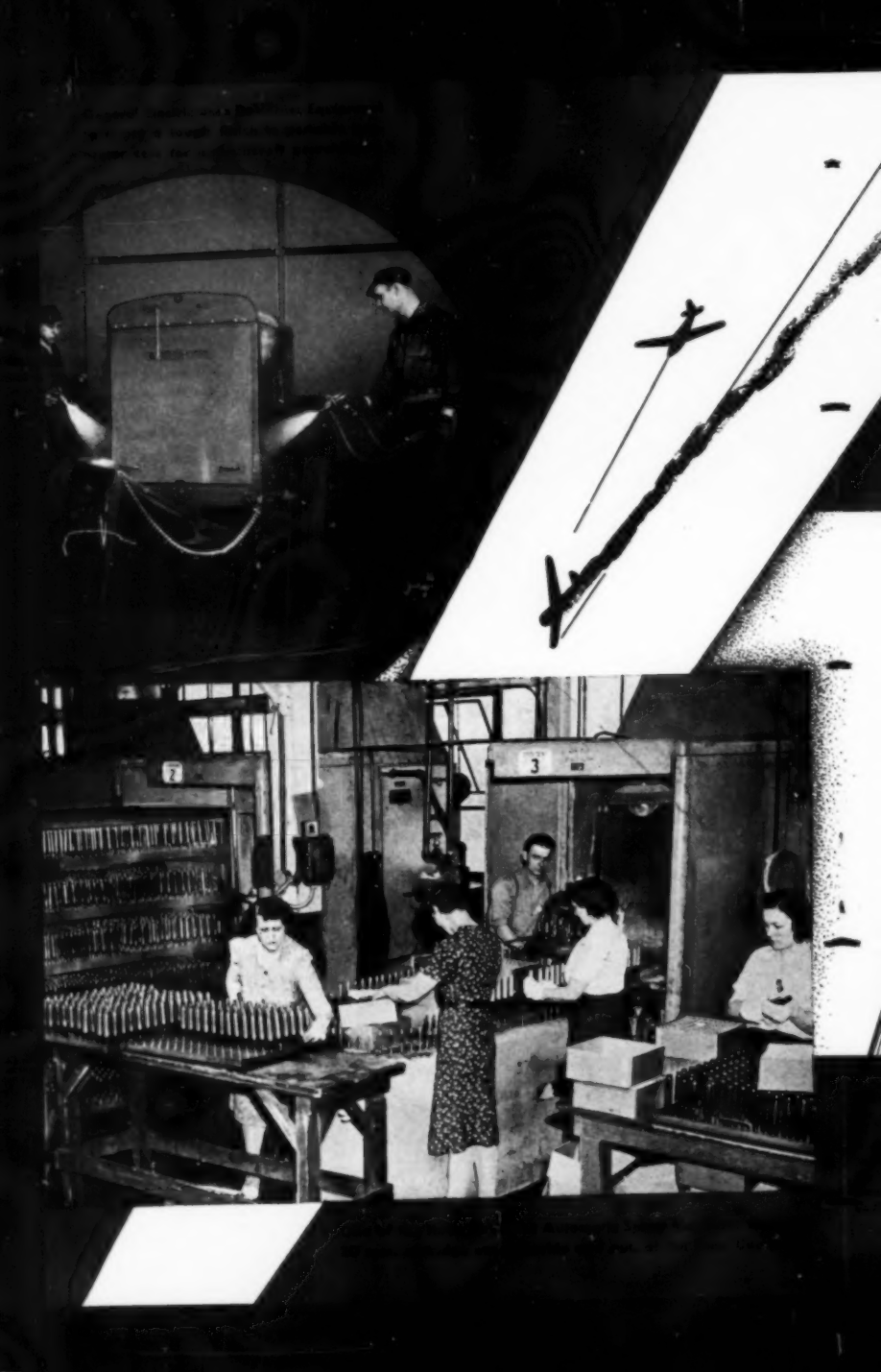

WAR power comes from many kinds of fighting equipment. Two widely-varied types are anti-aircraft searchlights and 20 mm. cartridges. And despite their wide range, you'll find DeVilbiss Spray Systems helping to speed their production with fast finishing.

One of the General Electric plants is producing power units for searchlights used in land and sea fighting. A rugged, weather-resisting finish is a necessity. And here you see how G. E. gives their generator sets this protection at top speed—with DeVilbiss Guns.

In making 20 mm. cartridge cases, the Dura Company must coat them inside and out to meet rigid War Department specifications. For both finishing quality and fast output, Dura uses three DeVilbiss Spray Machines that apply this all-over protection *automatically.*

No matter what your war product may be, there's no part of it too small or a product too big to get the time-saving, quality-improving results of DeVilbiss Spray Systems.

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vacuum-cleaned regularly to make sure that no dust is present to spoil the reflecting surfaces.

When the reflectors are taken from the oven they are rigidly inspected. If any slight imperfections show up, these reflectors are rejected and sent back for refinishing.

All metal parts of the fixtures made by this company, consisting mainly of the channel holding the fluorescent accessories, are covered with the same gray enamel as the exterior of the Masonite reflector itself, the spraying and baking of the assembly being carried out as a single operation.

Final Finish Is Durable and Highly Reflective

The final finish on both reflectors and channels does not crack or craze. It is also very resistant to scratching and chipping. The surfaces can be easily cleaned with plain soap and water, without fear of damaging them. These finished surfaces are resistant to alkalis, hydrogen sulphide, acids and other fumes or vapors likely to occur in the atmosphere of an industrial plant. They retain, to a remarkble degree, their original whiteness and high reflectivity.

The reflecting surface has an average of 88% reflectivity. On a panel tested for 100 hours under ultra-violet light, the loss of reflectivity amounted to only 3.1% from an initial reflectance of 90.3%, with an enamel thickness of 1.2 mils.

Paints for U. S. Navy

PAINTS used on navy vessels may be roughly divided into primers, bottom paints, topside exteriors, interior finishes, putties, sealers, fillers and seam compounds. The actual paint job on a warship falls into two divisions, that below the waterline and that above it. Both sections, generally speaking, require four coats of paint: The after-pickling coat, applied following the acid bath to remove mill scale; the primer, a protective coating containing zinc chromate with a characteristic yellow color; a coat of yellow-brown anti-corrosive paint; and one reddish anti-fouling coat. The anti-fouling layer, containing a copper base, is deadly to the barnacles and other marine organisms which cling to the ship's bottom and tend to reduce her speed.—U. S. N.

Now Ault & Wiborg Division of Interchemical Corp.

Effective September 1, 1943, Ault & Wiborg Corp., a subsidiary of Interchemical Corp., became the Ault & Wiborg Division of Interchemical Corp. In the interests of corporate simplification, it was found desirable to transfer to Interchemical Corp., the sole stockholder of Ault & Wiborg Corp., the business and assets of Ault & Wiborg Corp. The business will be carried on without change in management or other personnel.

American-Marietta Co. Plans More Advertising

Grover M. Hermann, president of the American-Marietta Co., Chicago, Ill., announces two changes that have been made in their advertising department to meet the requirements of the company's expanding advertising plans.

Robert A. Ornberg, who has been Advertising Manager, is now made sales promotion manager. Relieved of all detail work, he will arrange plans for post-war promotion, handle publicity and create all advertising material for the company's various divisions.

John M. Stiller, printing buyer for several years, becomes advertising manager and assumes all departmental responsibilities for personnel, direct mail and advertising distribution in addition to his regular production and purchasing duties.

Here is article on synthetic enamel finishes for fabric-covered aircraft.

I know that it is rather late to answer your letter, but I want to assure you that I did not forget. Everyone seems to be so busy these days, and I guess I'm no exception. I have been instructing a National Defense class in Aircraft Mechanics at the Burbank High School, and in my spare time have started a small company of my own.—

Wm. L. Plummer

Yes, Synthetic Enamel

WORKS WELL ON FABRIC-COVERED AIRCRAFT

BY WM. L. PLUMMER

THE INTRODUCTION of synthetic enamels into the field of aeronautics has been a long and arduous task. It has been an uphill battle all the way, due mainly to the poor start it made in the early stages of aircraft synthetic finishes.

As we all know, it has been the custom to finish fabric surfaces with clear dope first, followed by pigmented dope. This type of finish had been used so many years, it should have been evident that it would take a well planned selling campaign to get the synthetic enamel finish off to a good start. However, this was not done.

Synthetic Enamel Got Off To a Bad Start

The synthetic enamel finish was allowed to more or less leak into the field and into the hands of a few inexperienced operators. This was a very grave mistake, as every operator had his own ideas about its application. Repercussions soon developed, such as paint coming off, fabric checking, and trouble in patching the fabric, along with many other faults.

All of these faults could have been avoided if synthetics had been properly introduced. Synthetic enamel, properly applied, is the best all-around finish that can be applied. It not only is the best but also the fastest and the most economical.

First I will discuss the procedure and admirable points of a production finish on a fabric-covered airplane.

Clear Dope; Aluminum Coat; Synthetic Enamel

The first coat of clear dope is applied to the fabric by hand brushing. This is necessary to insure a good bond between the fabric and the dope for the base coat. The first coat of dope should be ap-

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If your present finish is working satisfactorily, stick to it. This is no time to change. On the other hand, if it doesn't, "SEA-LAC" would welcome a chance to prove itself. Of course, "SEA-LAC" Protective Coatings are passed and approved for war products.

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plied with as little thinning as possible, and it should be thoroughly brushed into the weave of the fabric. All succeeding coats should be sprayed.

Every other coat of clear dope should be dry-sanded lightly with No. 2/0 sandpaper. Drying time for each coat of dope is 30 minutes to one hour at 76° F. Six coats of clear dope are applied in this manner.

The seventh coat is an aluminum coat that is cross sprayed. The aluminum coat is prepared by mixing 4-oz. to 6-oz. of aluminum powder or paste to a gallon of clear dope. After two hours drying time the aluminum coat should be wet sanded with No. 220 wet-or-dry sandpaper. Thoroughly clean the sanded surfaces with wiping rags and repeat the seventh coat procedure, but for one exception; the sanding is done with No. 320 wet-or-dry sandpaper.

The finish is now ready for synthetic enamel. This should be a cross coat sprayed by an experienced operator. This coat is given an overnight drying period, after which the job is finished.

This finish needs no rubbing unless a satin finish is desired, in which case a light compounding will suffice. This finish will stand up in hot or cold weather, where the pigmented dope finish will break down. Oxidation is held to a minimum.

Refinishing Fabric Aircraft With Synthetic Enamel

The next phase of synthetic finishes is the refinishing of airplanes. It is in this field that synthetics are absolutely without equal. It is costly and not very practical to refinish a pigmented dope job with pigmented dope, for the following reasons: Due to the poor adhesive qualities of pigmented dope, the old dope must be perfectly clean before spraying. It is not possible to give the new finish a "tooth" in the old one by sanding because, if this is done, the old finish will check and open up when the fresh solvents hit it. It must be cleaned and all oxidation removed without the aid of sandpaper. Another reason is that pigmented dope needs several coats to cover. The more coats applied the more costly the finish becomes, and also more weight is added to the ship which is even more undesirable.

On the other hand, cleaning preparatory to refinishing with synthetic enamel is held to a minimum because sandpaper may be employed to remove oxidation on the old finish. The finished job will not increase the weight of the ship very much because one cross coat is all that is necessary.

The procedure for refinishing fabric-covered airplanes in synthetic enamel is as follows: Thoroughly clean the complete ship, using soap and water—or where there is grease to remove, use a cleaning solvent first. When the ship's surface is clean, wet-sand the complete airplane with No. 280 wet-or-dry sandpaper. The ship is now ready for synthetic enamel, which consists of a cross coat applied by an experienced operator.

How to Patch Holes in Synthetic-Finished Aircraft

Many operators have complained that synthetic enamel finishes can not be patched, but such is not the case.

The correct procedure for patching synthetic finishes is as follows: Square the hole in the fabric first. Then cut your patch out of some fabric that has been pre-doped with one coat of clear dope. Pre-dop-

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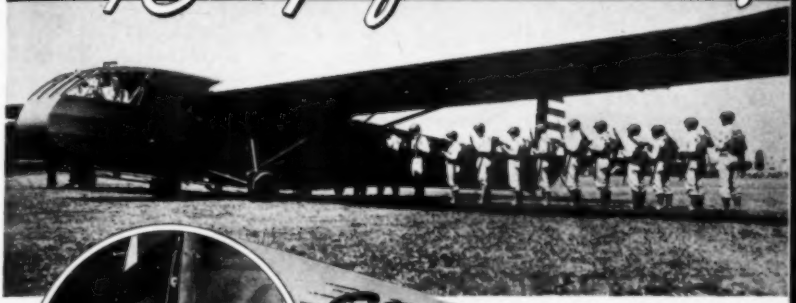

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ing makes your patch easier to handle. The patch should overlap the edges of the squared hole by 1½-in. Now you apply a light coat of dope to the edges of the patch 1½-in. wide. The next step is to place this squarely over the hole and rub out all air bubbles. Wait until this is thoroughly dry before applying the next coat. Here is where most operators have their trouble. They apply the dope too heavy, and this causes the synthetic to lift because dope and synthetic are not compatible. If the coats of dope are applied lightly, there will be no lifting. Sand every other coat until the patch is filled with dope comparable to the rest of the surrounding area. Then finish with synthetic enamel.

Fun in the Finishing Room

SOME TIME ago, my assistant and I decided to have a little sport with the finishing room foreman. Being assistant to the superintendent did not stop me, as we had been working hard and we felt that a little fun would help to relieve the tension.

Alex, the foreman, is a bit old fashioned and good hearted, but of foreign birth and a bit fearful of authority. I called him to the telephone and asked him to get a can of yellow lampblack, as we needed it for a sample. Alex, although he is a very competent finisher, became befuddled and said he'd have it down right away.

After a wait of 15 minutes, he called me back and said that he couldn't find the yellow lampblack. I raised my voice and bawled him out. I told him that it was in the inventory list and we needed it. Ten minutes later his helper brought me a yellow label can of lampblack.

Then I started in to bawl out the assistant. I went to the finishing room and started to roam around the shelves, insisting all the time upon getting some yellow lampblack, and threatening the foreman and his helper with dire results. By this time, Alex was almost in tears. The rest of the shop, in the meantime, were laughing their heads off. My assistant kept calling up and asking for the yellow lampblack. I could hold off laughter no longer. It was a relieved foreman to find out that I was kidding him along. Alex laughed heartily as I did. We still refer to the time we hunted for yellow lampblack.—J. HALPERIN.

Detrex Corp. Is New Name of Detroit Rex Products Co.

Robert A. Emmett, president and chairman of the board of Detroit Rex Products Co., metal-cleaning engineers, states that Detrex Corp. replaces Detroit Rex Products Co. as the new firm name. No change in ownership, company policy or management will be made.

The trade name "Detrex" a word now universally recognized in the metal cleaning industry, is therefore significant in the new title. It is concise and easily pronounced.

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TO conform with government regulations prohibiting the use of chinawood oil in the manufacture of standard wrinkle finishes, our laboratory has developed a complete line of wrinkle finishes without this critical material.

Victory Wrinkle Finish gives a uniform wrinkle of the desired pattern in a single coat using ordinary methods of application. Its characteristics are similar to those of our well-known Duart Wrinkle Finish, providing a tough, durable coating which readily covers surface imperfections. It is supplied in a full range of colors. Write for full details.

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Holds Flat Work by Vacuum

Where it is necessary or desirable to hold flat plates or other small flat work in position for masking, spraying, striping, stenciling, etc., without using clamps or holders, the vacuum chuck is offered. The accompanying illustration shows two possible simple arrangements of the vacuum chuck system.

There is the flat stationary chuck and the rotating disc chuck. In some lines of special product painting or finishing, these chucks are very useful and handy.

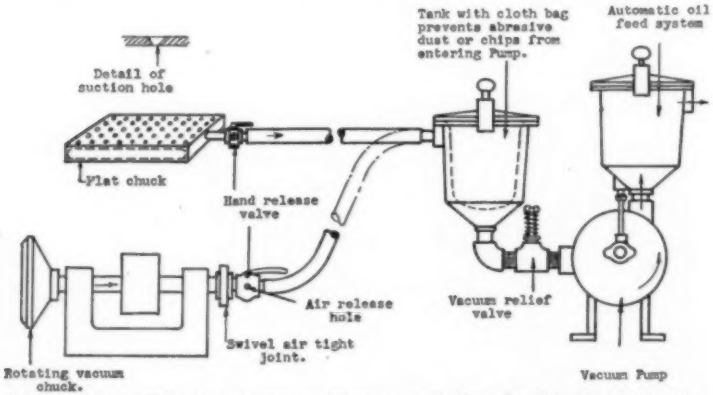
A strong suction of air is utilized to take the place of mechanical or magnetic chucking to hold articles to be worked on. The article to be held may be of any material—metal, glass, plastic, wood, paper or what not, so long as it has a reasonably flat surface so that the suction or vacuum may have an area upon which to exert its pulling or holding strength.

A hollowed-out flat chuck may be used in most cases—one having a connection for the air suction and a series of countersunk holes in the surface for holding purposes. In using this chuck, all holes in excess of those actually required for holding the article may be covered with a sheet of cardboard or paper.

Any degree of holding strength may be secured according to the weight of the article to be worked upon, and in accordance with the strain exerted by the operation performed.

For lathe work, a rotating vacuum chuck may be used and this may be of the open type, or of the flat perforated type, as desired. In using the rotating chuck, an airtight swivel joint may be used on the pipe connection to the source of the vacuum or suction.

Full information may be secured of Leiman Bros., HD-137 Christie St., Newark, N. J., who are prepared to furnish the vacuum outfit necessary to operate this system of rapid chucking.


Tank with cloth bag prevents abrasive dust or chips from entering Pump.
Automatic oil feed system
Detail of suction hole
Flat chuck
Hand release valve
Air release hole
Swivel air tight joint.
Rotating vacuum chuck.
Vacuum relief valve
Vacuum Pump

You can have a flat chuck in any position, or a rotating chuck to hold the work.

DON'T MISUNDERSTAND US: Tea leaves are all right for those who deal in futures. But when it comes to solving the problems of the immediate present, nothing but the hard facts of practical experience counts. The last two years have given us plenty of what it takes to meet the problems of Government specifications. If you are having difficulty getting the right color, the exact infra-red reflectance, or the proper degree of flatness, get in touch with us. Phone us at our expense: Pittsburgh, CEdar 8100. Our laboratory technicians will be glad to talk finishing problems with you.

WATSON-STANDARD CO.

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PAINTS · VARNISHES · INDUSTRIAL
FINISHES AND LITHOGRAPH COATINGS

TOUGH JOB HEADQUARTERS
℞ **Prescription Finishes**
Give us your metal coating problem. We guarantee you an answer based on your conditions, and not just a standardized formula.

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BOSTON, BUFFALO, DETROIT, NEW YORK

Gage Tells Size of Any Pipe Anywhere

A new pocket size, 3-point pipe gage for instantaneous measurement of all sizes of pipe from ⅛ to 12-in. is announced by the Three-Point Gage Co., 3821 Broadway, Chicago, Ill.

This gage consists of two pivoted steel plates with edges curved at three points for contact with the pipe to be measured, together with a scale which automatically registers, not only the pipe size in terms of inside diameter, but the drill size for tapping.

An additional advantage, claimed for this new gage, is that it is necessary to contact only a small section of the pipe contour and that it will measure pipe in any position, even against the wall or in a corner, and will measure a covered pipe if there is a small opening near a union or other fitting where the gage may be slipped in. It is also maintained that the gage can be applied in dark places and taken to the light for reading. The gage is constructed of steel with deeply etched numerals, and its size when closed is only 2½x4¼-in.

Photoelectric Glossmeter Measures Gloss

The Photovolt Photoelectric Glossmeter is designed for measuring the gloss of paints and varnishes, ceramics, plastics, paper and machined or polished metallic or non-metallic surfaces. It is also suited to register changes in gloss as a result of age, wear, abrasion, exposure to moisture, heat, light, vapors or sprays.

It is a self-contained portable outfit.

The Glossmeter comprises the instrument proper and the search unit which is connected to it by a flexible cable. The search unit may be placed on the sample to be tested; or, the search unit may be positioned with the opening pointing upward so that the sample is placed on top of it. The unit may, furthermore, be turned with the opening sideways for convenient measurement of vertical surfaces. Samples can be of any size and may be measured in rapid succession.

The instrument is available in two models. Model 650 is operated by dry-cell batteries which are housed in the instrument casing; Model 660 is built for operation from a 105 to 125-volt, 50 to 60-cycle AC power line.

The Photovolt Glossmeter is designed to measure the type of gloss called "specular gloss" and defined as brilliance of the specularly reflected light. It is also suitable for determining "contrast gloss," defined as contrast between specularly reflecting areas and other areas. Special search units are available to measure "sheen," i.e., specular reflection at grazing angles.

This Glossmeter is a product of Photovolt Corp., 95 Madison Ave., New York, N. Y.

Portable Universal pH Indicator

Anyone in laboratory or plant, who needs to measure pH, will be interested in the new and improved portable universal pH indicator brought out by Leeds & Northrup Co., 4934 Stenton Ave., Philadelphia 44, Penna. It has direct reading with glass, hydrogen and quinhydrone electrodes, combines the same sound measuring principle and durable qualities of its predecessor with the following added advantages: 1) self-contained electrodes of new and improved design; 2) in addition to the standard 50-ml sample beaker, a small volume holder

Post-War Paint Competitors Will Be Chemists

While the contact man will present the story of accomplishment, the man in the laboratory smock will be the man who determines the weight of the contact man's words. ¶ Berry Brothers is well aware of this "new competition" and is now drawing heavily on its research facilities to prepare new and better finishing products for post-war use. ¶ Out of the skies... where Berryloid Aircraft Finishes enjoy such outstanding leadership and preference... and from the battlefronts ...where Berry Brothers wartime finishes are daily meeting many difficult requirements... will come many vastly improved finishing materials for peacetime industry. ¶ Finishes of greater beauty and durability, of greater resistance to heat, chemicals, food acids, fats, chipping! Finishes that require fewer coats and dry faster! Finishes that will speed production, cut costs, strengthen *your* competitive position when again you resume normal production.

BERRY BROTHERS, Inc.

Quality Finishes Since 1858

INDUSTRIAL VARNISHES • ENAMELS • LACQUERS

DETROIT, MICHIGAN • WALKERVILLE, ONTARIO

JERSEY CITY • BOSTON • CINCINNATI • CHICAGO • ST. LOUIS

for samples of approximately 2-ml; 3) a reduction in the number of knobs and switches used in standardizing and measuring; 4) a polarity reversing switch for the volt range.

Compactly housed in a light-weight carrying case, it is easily accessible because of the quickly removable lid, and the hinged end of the case. The convenience of this portable indicator is further enhanced by the 15-in. leads supplied with it, which make it possible to use the electrodes outside of the case.

Sanding Discs for Cleaning, Smoothing

The Fibre Abrasive Corp., 1129 E. 74th St., Chicago, Ill., announces a new line of Marvel abrasive sanding discs made of aluminum oxide grit, firmly bonded with a special heat-resisting resin to a chemically treated, super-pliable, genuine fiber back. A resin bond will not soften under high speed frictional heat, and, according to the manufacturer, Marvel discs are extremely hard and tough, and require less cleaning and replacement than the conventional glue-bonded disc.

Designed for high speed continuous work, Marvel abrasive sanding discs are available in diameters ranging from 6 to 30-in. and in all grit numbers. A sample disc for testing purposes may be obtained by writing the manufacturer. Specify diameter of disc and arbor hole and number of grit desired.

Paint Brush Restorer

"Prestorer" is the name of a new and different cleaner for cleaning paint brushes — especially for restoring to usefulness the rock-hard, paint-caked brush that seems hopeless.

According to the manufacturers, Technical Development Laboratories, Tenafly, N. J., "Prestorer" will not injure the worker's hands for it contains no high-powered caustic alkalies. It is never a fire hazard, since it is non-inflammable, and it gives off no poisonous fumes.

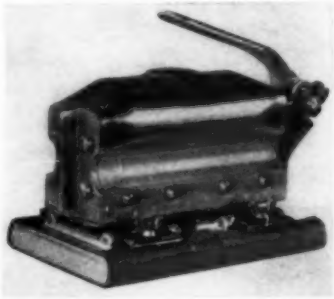
The action by which "Prestorer" does its work lies in the absorption of part of the solution into the bristles by capillary attraction. The bristle swells, causing the hard paint pigment to crack off. After drying, the swelling disappears and the bristle returns to normal size without injury. Since pigment is not dissolved, the used solution may be strained through cheesecloth and kept clean for use over and over again.

Non-Vibrating, Light-Weight Portable Sander-Rubber

Designed and built for all practical sanding and rubbing operations in the finishing room, the Sundstrand Sander, manufactured by Sundstrand Machine Tool Co., Rockford, Ill., is now available in a light-weight, high-speed Model 1000.

This smaller and lighter machine weighs less than 6-lbs., has a speed of 3,500 oscillations per minute, can be equipped with different types of sandpaper attachments for large or small, wide or narrow, flat or curved surfaces on metal, wood, plastics or composition.

Operation of the machine is ob-



For finish room sanding or rubbing.

Continuously supplying finishes to Wright Field since 1935.

Guardsman AVIATION FINISHES

Check These Test Figures for Plywood Finish Advantages

Less Weight — less time — less labor — and ***up to 50% less water absorption*** are among the many advantageous qualifications of Guardsman Finish and Guardsman methods for finishing of non-fabric covered plywood aircraft, proved by these test comparisons.

	Old Method	*Guardsman Way*
Number of Operations	Five	Four
Man Hours of Labor on Test Assembly	1 hr., 20 min.	1 hour
Elapsed Time for Finish	12 hrs., 20 min.	6 hours
Material Consumed	5½ gals.	4 gals.
Wt. per 1,000 sq. ft.	45 lbs.	30 lbs.
Water Absorption, 7-day Immersion Test		Up to 50% less water absorption than old method

Guardsman AVIATION FINISHES

What GUARDSMAN is doing for others, it can do for you.

Exclusively Manufactured by

GRAND RAPIDS VARNISH CORPORATION

GRAND RAPIDS · MICHIGAN

tained with pad movements started and controlled by a palm lever fitted at top of the machine housing. When machine is gripped to operate, the reciprocating action of pads starts. Upon release, the machine automatically stops.

This sander, driven by compressed air, is free from vibration. Opposed pad action and balance of moving parts eliminate all vibration and improve the qualities and uniformity of the finished product. Elimination of vibration reduces fatigue and increases the efficiency of the operator.

Uniformity of the stroke and the high speed of the reciprocating pads materially increase the life of abrasive paper by keeping the paper surface free from material particles.

New Sealing Tapes

The Paint Division of the Pittsburgh Plate Glass Co., Pittsburgh, Penna., has developed several sealing tapes to help speed the production of American and Allied warplanes. Fabseal, Chromseal, and Stratoseal are made in rolls 50-ft. long and widths varying from ½ to 24-in. The application of sealing tapes is a great deal faster than the application of caulking compounds with a putty gun or by hand. Thus many man hours are saved in the over-all construction of aircraft.

Fabseal is particularly designed for use as a gasket in the construction of flying boat hulls, gas and oil tanks where internal or external pressures are encountered under constant vibration or sudden impact. It is an impregnated fabric with an interleaf separating the fabric layers. Before the fabric is impregnated with compound, it is treated to make it water-, gasoline-, and oil-resistant to prevent wicking action. The tape may be applied to any metal or wood section of a fuel tank, pontoon, etc., and after application the interleaf is removed, exposing the upper surface of the tape, which is then ready to receive another riveted or bolted section. Fabseal is .010-in. thick when compressed between surfaces under rivet or bolt pressure, and can be doubled up in application when additional thickness is desired.

Chromseal is a solid ribbon of compound with no fabric as part of its composition, and therefore is more flexible than Fabseal. It is especially suited as a gasket material between riveted or bolted surfaces or integral fuel tanks, droppable reserve tanks, as well as a seal for plastic enclosures and glass cockpit framing. Chromseal can be molded by hand to conform to almost any angle, curve, or contour. It is also highly resistant to gasoline, oil, and water.

Stratoseal, as its name suggests, is designed for the sealing of the cabins of stratosphere-flying planes.

Roxalin Flexible Finishes, Inc. Promotes J. F. Burrowes

Roxalin Flexible Finishes, Inc., Elizabeth, N. J., announces the promotion of J. F. Burrowes to the position of manager, Technical Service.

Mr. Burrowes advances to this new position after one year as assistant manager of technical service. Prior to this, he represented Roxalin for four years as field service man in the New England states.

J. F. Burrowes becomes Manager, Technical Service for Roxalin, after having been the assistant manager.

Monroe Sander Corp. Expands

Due to the ever-increasing demand for its products, the Monroe Sander Corp., 10-18 46th Ave., Long Island City, N. Y., manufacturers of paints, lacquers, varnishes and synthetics, has taken additional 5,000-sq.ft. in the building at 10-12 46th Ave., Long Island City, adjoining its present place.

HILO RIP-PL FINISHES

Performing

IMPORTANT WAR DUTY FOR LEADING MAKERS *of* RADIO AND ELECTRONIC EQUIPMENT

Hilo Rip-pl Finishes are now made with a Linseed Oil Base. May be baked like the old type wrinkle finishes. These Rip-pls will meet all the requirements of exterior durability, salt spray resistance, toughness of finish, etc.

Write Today for Samples and Details

HILO

Established 1863

HILO VARNISH CORP.

42-60 STEWART AVENUE BROOKLYN, 6 N. Y.

CHICAGO: 2420 Washburne Ave. BOSTON: Park Square Bldg.

Questions and Answers

Salvaging Jellied Enamel

We will appreciate some information from you regarding the method of salvaging enamels or lacquers that have turned to jelly or have livered. If you can give us any information along this line, we will be very grateful.—A. B. Co.

We have just called up the chief chemist of a local manufacturer of paints, varnishes, lacquers, etc., and he advises us that you can probably salvage jellied or livered lacquer by adding lacquer thinner and stirring or agitating same. However, he holds no hope for salvaging any jellied or livered enamel. He says that his company has had no success in this.—ED.

Cleaning Paint From Conveyor

About 80% of our product painting is accomplished through the medium of a water-wash spray booth and an endless steel-mesh conveyor. At the present time we are using a strong heated caustic solution to remove the paint as the belt conveyor progresses.

It has come to our attention that there are on the market, other ways of automatically cleaning this type of conveyor, such as vapor processes and various types of reclaimable paint solvents. This is a request for any information you may have available on these apparently more economical and efficient methods of removing excess paint from the mesh conveyor.

We would appreciate hearing from you in this connection, at your earliest convenience, for we anticipate installing an additional conveyor and are desirous of incorporating this new type of cleaning agent, if it proves to be satisfactory and practical.—B. N. Co.

Editor's Note: A well-informed practical man, who has had several years experience as a spray-equipment field engineer, replies to this question as follows:

From my experiences in the field there is no practical method of removing paint from any object, with stagnant caustics, solvents, vapors or compounds.

To satisfactorily remove paint from a steel-mesh conveyor, after it has passed through an oven (and in most cases where it has not), it is necessary to create some force by agitation, high pressure nozzles, or mechanical brushes in contact with the surface.

The most effective method, I would say, is the last mentioned (brushes) but when brushes work on the wire mesh the wires become slowly but surely worn, causing more frequent adjustments of the conveyor, and the conveyor's life shortened considerably.

The two other methods do no damage to the conveyor and do not affect its useful life. However there is some wear on the equipment that is installed to do the work which, in both cases, is a pump.

POSING...

As the model poses for the eye of the camera so does your product pose for the critical eye of the consumer. Our Creative Studio conceives finishing schemes for all sorts of products made of wood or metal . . . finishing schemes that have protective qualities and an extra measure of eye-appeal. We invite you to use this service without cost or obligation.

No Tampering with Quality

Rockford finishing materials for war products are fulfilling the most rigid requirements.

ROCKFORD VARNISH *Company*
ROCKFORD, ILLINOIS

Manufacturers of Protective and Decorative Coatings

In the first instance the agitation should be violent. The materials can be cleaned and reused with this method. In the second instance the pump should be of a high head, using nozzles properly directed and in sufficient number to cover the full width of the conveyor.

This method is better than the idea of using brushes, but it has the bad feature of having nozzles and headers which could become clogged if the materials are not well filtered. This method also will consume more of the cleaning solution because of evaporation from atomization.

I know of no vapor method, and doubt that there is one which is satisfactory, although, of course, there is something new every day.

Pickled Oak

We have a great deal of work on pickled oak veneer but seem to be unable to obtain satisfactory results. Kindly advise us what step follows the application of the [white?] lead. We have been using shellac, but the result is not a uniform finish, but very blotchy.—F. N. Co.

An experienced practical finisher suggests the following:

Starting with the wood in the white (the bare wood), wire brush the surface with the grain to remove any sanding dust, etc., that may be inbedded in the pores. This may rake out a little of the soft wood between layers of hard grain, but in most cases this is desirable for the finish specified.

When the surface is clean and smooth, apply a wash (thin) coat of shellac or whatever clear sealer you use or can obtain. When dry, sand lightly with No. 2/0, 3/0 or 4/0 sandpaper to remove any raised fuzz, etc., and to make the surface smooth. Don't sand hard enough to cut through the wash coat.

Now apply your filler—whatever you are using to show white in the wood pores. This filler should be of the right kind and of suitable consistency to produce satisfactory results. Wipe the surplus off and it will come clean without leaving that blotchy appearance.

When the filler is perfectly dry, clear down to the bottom of the pores of the wood, apply your clear shellac or sealer coat, and when this is dry, follow with whatever finish coat you plan to use.—ED.

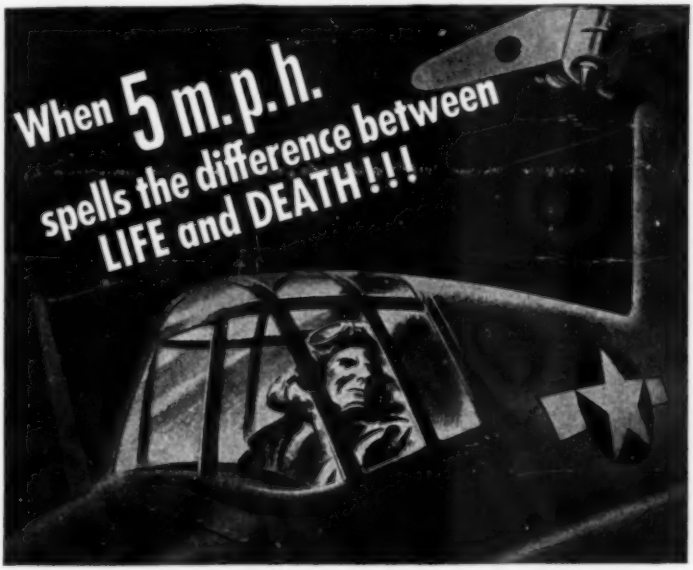
Protective Coat That Can Be Peeled Off

Referring to the new masking material for plexiglass, as mentioned on page 119, January 1943 issue of INDUSTRIAL FINISHING, I would like to know the manufacturer's name and, if possible, whether I can obtain some samples.

Do you know of a temporary coat for plastic; something that can be removed after shipment? This is a protecting coat for preventing corrosion due to the exposure to salt-water air, etc., and is applied over painted surfaces and later peeled off.

I will appreciate any information you can supply me as soon as possible.—A. W.

The masking material you saw mentioned on page 119, of January 1943 issue of INDUSTRIAL FINISHING Magazine, is "Protektol," manufactured and sold by Ault & Wiborg Corp., New York, N. Y. This same material will answer for the other question you asked.



THE microscopic roughness of the dull-finish enamels customarily used to camouflage combat planes increases wind resistance at the high speeds they attain. The resultant loss of speed — even a very few miles per hour of it—is a vital factor in the air. So Arco has developed AIR-SLIP, a *lusterless* enamel which provides most of the advantages of a highly polished surface . . . gives the boys those few extra m. p. h. which often spell the difference between life and death.

Paints for Industry THE ARCO CO.
CLEVELAND, OHIO • LOS ANGELES, CALIF.

Industrial FINISHING

Distributed monthly to finishing room and paint shop foremen, production superintendents and company officials of metalworking, woodworking and miscellaneous industrial plants where production finishing is a major operation in parts and products manufacture.

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Editorial

Foreman's Wartime Labor Problems

★ Eighteen months ago the average foreman finisher thought he had a lot of labor problems—and he did have—but the labor problems he faces and solves today make those of a few months ago fade into insignificance.

The selective service first called our younger men into the armed forces. We filled their places with female employes. These we had to train, but so long as we only had to train a few at a time, we had enough experienced men to train them, and we got along fairly well.

But selective service has made such great inroads into finishing room workers, and the fact that many other workers have left for more lucrative employment elsewhere—this has left the average foreman finisher with little if any experienced help. As a result he is obliged to spend a lot of his time training new help when he should be supervising the progress of work through his department. He doesn't have enough experienced workers to help him train his inexperienced employes. For instance, the foreman finisher often spends several hours in a spray booth trying to train an inexperienced sprayer, when other important work is being neglected.

Then the war has gotten many working people very unsettled. When a foreman has worked for days and weeks to train an employe, many times this employe will suddenly leave the job and find another one that he thinks he may like better, for any one of several reasons.

Another problem facing the foreman is training female help for key positions. Sometimes it is hard to impress upon them the importance and the responsibility of their jobs, as they feel that, in most cases, their work will only last as long

★ Guest Editorial . . . Many readers can write an excellent editorial — two or three paragraphs that present a timely suggestion or valuable idea which will stimulate real thought on a live subject. The Editor welcomes guest editorials and pays for those that are published.

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FACTORY - RAHWAY, N.J.

as the war, so they just don't want to accept responsibility. There is also the problem of keeping women away from work that may call for any heavy lifting, as few women can lift as much as a man.

Women and girls usuall tire more easily, hence in many cases they cannot produce as much as men. They must have rest periods. Often it is necessary to work three women where we formerly worked two men, and of course this means more training.

Then there is the problem of taking what experienced employes we have and placing them in key positions. Sometimes this is quite a problem, for a man who has been particularly valuable on certain operations may not fit in so well when he is changed to a new position, such as a foreman's assistant.

But after all, this is war. Each of us must put the best that we have into our job. Each of us has a job to do and our job is surely no harder than that of our boys on the battlefront. So we will just have to make the best of a bad situation until the war is over.—H. W. CHESTER.

Let's Do More to Help Prevent Accidents

★ Industrial accidents are robbing us of vital manpower. The year before last 19,000 workers were killed or crippled for life; 100,000 others lost either an arm, leg, hand, foot or eye.

Since Pearl Harbor, more workers in the U. S. have been killed by industrial accidents than the Navy, Coast Guard and United States Marines — all combined— have lost in battle.

Industrial accidents are largely preventable. They are due mostly to carelessness and negligence. Those who fall in battle die for a cause. Those struck down by industrial accidents die in vain.

Besides this loss of manpower—sufficient to build hundreds of warships every year—industrial accidents interrupt the orderly flow of production, and often result in serious damage to machinery, equipment, and work in process. They delay delivery of war materials.

A nation at war cannot afford this waste of manpower, machinery, and materials.

Industrial accidents have caused more loss of man-hours than all the strikes, material shortages and transportation difficulties put together. It's a No. 1 personnel problem.

Effective ways and means of reducing the number of industrial accidents are known to all. American labor and management must utilize these ways and means, and drastically reduce industrial accidents if we are to achieve maximum efficiency in war production—*Industrial Incentive Div., U.S.N.*

Random Comment on the Industrial Scene

BY LAWRENCE H. SINGER

Letter From Detroit—We have received a friendly note from Charles F. Kettering, famed vice-president of General Motors. "I have no objection," writes the big auto company's research director, "to your quoting from my recent radio address in your monthly review for INDUSTRIAL FINISHING."

The wizard of Michigan was discussing post-war horizons in the worldwide talk about which we had written him. Replying to those who think we have neared the saturation point in industrial progress, he commented: "About the time of the beginning of the railroads, a man resigned from the patent office, because he thought all the great inventions were made. Yet we have the telephone, the radio, the petroleum industry—all of them unthought of 50 years ago. So we cannot say that the world is finished."

* * *

Finisher's Shortcut to Victory—The other day we learned how a foreman finisher helped to cut a crucial war production bottleneck. Chevrolet has developed a novel method of spray-painting aircraft engine crankcase sections. A technique involving the closing of cylinder portholes with quick-fitting masks, after the three sections have been assembled, has cut the finishing time 56 minutes per unit!

This department would be happy to hear of similar innovations perfected by other production soldiers on the finishing line.

* * *

1947 Models—Take note of Triptane; it is a product that is destined to become a household word. As you may know, it is one of the most recently perfected high-octane gasolines, proven in the stern combat of war.

This potent fluid is destined to profoundly affect motor car design—not in the days immediately following the end of the war, but two or three years later.

The 1947 car, in all probability, will do 40 miles per gallon on the new gas, and it will be much lighter and cheaper than pre-war automobiles. Says famed researcher, Dr. Charles M. A. Stine: "Since

American Doughboy at Salerno

AIRPLANES
GUN STOCKS
BOMB SIGHT BOXES
TOOL CHESTS
MARINE PARTITIONS
RADIO INDUSTRY, ETC.
SKIS
INSTRUMENT BOXES

LT. GEN. MARK W. CLARK'S valiant Fifth Army stood up against several of Germany's crack Panzer Divisions in their battle to hold the Salerno beaches.

It was the American Doughboy who dug in and held on during several days and nights of severe pounding. It was the American Doughboy, whose unsung heroes are legion, who made the best possible use of his modern equipment in this gruelling test.

A salute to our Doughboys and to American workmen who are supplying him with the world's finest fighting equipment.

Listed here are a few of the war products now being coated with our materials. Phone, wire or write and let one of our finishing experts help you "keep production rolling."

THERE'S NO TIME TO LOSE—THERE'S JUST TIME TO WIN!

THE LAWRENCE-McFADDEN CO.
Headquarters for Fine Finishes Since 1875
7430 STATE ROAD PHILADELPHIA, PA.

An Outstanding—
Shellac Replacement Product

ENAMELS
BAKING ENAMELS
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SHELLAC
FILLERS—STAINS
FINISHING SUPPLIES

Has all the desirable qualities of Shellac.

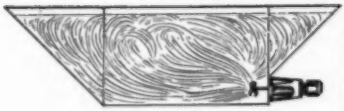
Has extremely high resistance to water — Thins with alcohol — Dries fast and hard — Good adhesion — Sands easily.

It is a development of our laboratory and has been thoroughly tested over a long period.

A GENEROUS WORKING SAMPLE WILL BE SENT FREE ON REQUEST. WRITE TODAY.

NEW PERIOD PRODUCTION FINISHES

NEW YORK WOODFINISHERS SUPPLY CO. INC.
109 IMLAY STREET BROOKLYN, N.Y.
Established 1917



Agitate Dipping Tanks with "LIGHTNIN" MIXERS

Here is a way to get dipped finishes that will be certain to meet Army specifications and pass inspection. Use *"LIGHTNIN"* Mixers on your dipping tanks.

This mixer will prevent the settling of heavily pigmented, thin paints so that uniform coating can be constantly maintained.

If mixing or agitation is one of your problems, consult Mixing Equipment Co., Inc., whose mixing experience is yours for the asking.

Note on Priorities: All offerings and specifications are subject to such government regulations as may be announced from time to time in connection with critical materials. Immediate shipment on many models and parts.

MIXING EQUIPMENT COMPANY, INC.

1027 GARSON AVENUE • ROCHESTER, N.Y.

automobile production stopped, the shiny new models that are gathering dust in dealers' showrooms have aged technically at least 20 years."

* * *

Mildew-Proofing — Here is another war development that may have important peacetime application: You may have heard about the Puratized Process, perfected by the Gallowhur Chemical Co., of Windsor, Vermont. It is being used by the Army and Navy to make clothing, shoes and equipment mildew-proof.

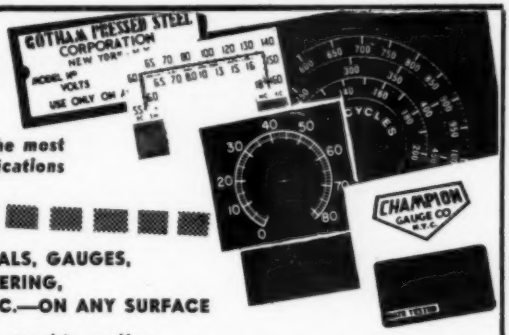
The addition to paints of the chemical used in this technique, it is now claimed, will help to eliminate troublesome yeast mold in breweries, bakeries, and other plants. Another interesting possibility might be the manufacture of paints for swimming pools and boats that would be algae-proof. This sounds like an item worth watching.

* * *

Road to Peace—"Wars will continue with increasing brutality and vigor unless there is found a greater use for manpower," was the challenging statement made recently by Leo M. Cherne, Executive Secretary of the Research Institute of America. Speaking before the Export Managers' Club, he added that foreign trade was the key to the increased use of manpower and extended employment. Mr. Cherne expressed the fear, however, that this nation will face a strong temptation, in the post-war period, to adhere to the doctrine of self-sufficiency.

* * *

Age of Light Metals—Did you know that aluminum sold for $545.00 per pound in 1852, and that its price was $5.00 per pound as recently as 1915? We came



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across those facts in an eminently readable pamphlet, "The Light Metals," just released by McGraw-Hill. All production men will find the booklet crammed with interesting data.

Among the multitude of post-war uses predicted for aluminum are: Doors, engine castings, and rear axle assemblies for automobiles; lifeboats, ship superstructures, railroad hopper cars, household furniture, window frames and screens.

Commenting on the often-expressed fear of a huge surplus of light metals after the war, the report says: "If the industry can sell 500 lbs. of aluminum per car, even at the 10-year prewar average of 2,240,000 passenger units a year, Alcoa will be justified in keeping its worry division in the production department."

Weight-Saving — But there are other ways to effect tonnage reductions, and welding, of course, is one medium. According to Pullman-Standard Car Mfg. Co., welding of many postwar products will bring lower costs, lighter weight, greater strength, durability and safety.

The company cites a striking example: Welding eliminates four tons of dead weight in a 50-ton steel boxcar. This means that if the nation's 800,000 boxcars were constructed according to this modern technique, an additional freight capacity of 3,000,000 tons would now be available to serve industry.

* * *

Good Old 2000 A. D.—There is some fascinating reading in a report by Edward R. Dewey, of the Foundation for the Study of Cycles. A post-war boom will last

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until 1947, says the review, to be followed by a slump hitting its low point in 1951.

Checking over past patterns of the decline and fall of civilization, another member expects the world to hit a new low in 1960, with a golden age beginning around the turn of the next century. And don't get the idea that this is a crackpot organization. Its membership includes topflight scientists from Harvard, Yale, Columbia and other leading halls of learning.

* * *

After the Last Shot — Gloomy forecasts of prolonged depression when peace comes were dispelled by Ralph Robey, able financial commentator, in a recent survey for "Newsweek."

Only 10% to 20% of American industry will have a major reconversion problem, he maintains, and employment will not drop because production won't—and also because of plans for gradual demobilization of our armed forces. Mr. Robey makes one important reservation—that victory be not too long delayed.

* * *

Intelligent Cooperation — "Getting agriculture, government, industry and labor to work together for the common objective of production, employment and security," is the commendable aim of the National Planning Association.

E. J. Coil, executive director of the organization, has sent this department a copy of their publication, "Business Reserves for Postwar Planning," which is a brilliant treatise.

The N. P. A. is a unique body, insofar as its membership embraces leaders in business, agriculture, labor and government. Its impartial studies in the fields of steel, transportation and postwar problems have been widely acclaimed. In the words of Industrialist William L. Batt, chairman of the association, it is a national "looking-ahead" organization.

* * *

Broadcast Tickets—Readers are again reminded that visitors to New York City may obtain free radio tickets to many leading radio shows by addressing us as follows:

Lawrence H. Singer
130 West 86th Street
New York 24, N. Y.

Among the cooperating sponsors are the Texas Co. and Lucky Strike Cigarettes. A week's advance notice is generally helpful.

L & R Mfg. Co. Moves

The L & R Mfg. Co. announces that it has consolidated its manufacturing facilities, offices and laboratories in a new and larger plant at 577 Elm St., Arlington, N. J. The company's products include cleaning machines and cleaning and rinsing solutions.

Air-Motored Agitators for Stirring Paint

A new booklet (24 pages, 8x10½-in.) showing Pneumix air-motored agitators in use on different types of work is announced by the Eclipse Air Brush Co., Inc., 400 Park Ave., Newark 7, N. J.

In addition to illustrations, the booklet contains a catalog of these agitators that are operated by compressed air, and a price list.

Two of the most outstanding features of the Pneumix agitators are the elimination of fire and explosion hazards on mixing operations, and the variable speeds obtainable through air control.

This booket, entitled "Pneumix in Action," is a companion piece to the company's booklet on its spray equipment, and will be sent on request.

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Wyandotte F-100 will help cut your floor-cleaning costs. Even heavy soil disappears when this remarkable compound gets to work!

Technical Development Mgr. for Advance Paint Co.

Charles M. Rice has been appointed Manager of Technical Development for the Advance Paint Co., Indianapolis, Ind. This step is in accord with policies of the Advance Paint Co., as now being adopted in connection with postwar planning.

Mr. Rice was recently with the War Production Board, as assistant to Mr. J. W. Raynolds, Deputy Director of Chemicals Division on the coordination of resins, plasticizers, plastics, and solvents. Previous to that time, Mr. Rice was in the Protective Coatings Section of the Chemicals Division on Resins and industrial finishes.

Prior to his affiliation with the War Production Board in Washington, Mr. Rice was manager of the Cleveland office of the Bakelite Corp. on technical sales of their coating resins and this position was preceded by technical sales both in New York and Cleveland for Bakelite.

Metal Cleaning Booklet Free

Speed and thoroughness are two important factors in the electrolytic removal of insoluble smut, grease, oil, dirt, machining compounds and other deposits from metal surfaces prior to painting or finishing operations. Interesting technical data on this problem has been compiled in a new, 16-page booklet, issued by Oakite Products, Inc., 32 F. Thames St., New York 6, N. Y., describing the use of a specially developed material, Oakite Composition No. 90, for the anodic degreasing of steel and copper war material.

The booklet explains how this material quickly and completely removes such tenacious foreign matter as insoluble smut, buffing, polishing, stamping, cutting, drawing compounds, grease, shop dirt, oil and other accumulations from steel and copper surfaces. It is also reported that Oakite Composition No. 90 provides a shallow, dense foam blanket on the surface of the solution which stays within definite limits and eliminates dangers of overflowing, fuming and explosion. Another problem solved by this material, the booklet states, is the removal of soil from parts having deep recesses which may not be exposed to good electrocleaning action due to their unusual shape or size.

Supplementing this data are informative case histories describing the use of Oakite Composition No. 90 in cleaning aircraft, bomb and radio parts, steel shell magazines, cartridge boxes and many other types of war material prior to painting other finishing operations.

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Infra-Red Gas Burners

New Way to Test Metal Finishes

THROUGH the use of a new testing technique which makes use of extremely thin iron foil, an indication of the value of metal-protective finishes under severe conditions frequently encountered in practice can now be had in a matter of days, in comparison with months for ordinary exposure tests.

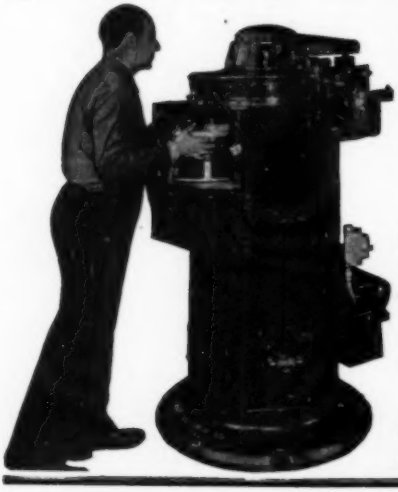
This new technique was described recently in a paper by Drs. G. D. Patterson and C. K. Sloan, of the Du Pont Co., before the American Chemical Society in Pittsburgh. It involves the use of thin, uniform films of paint applied to small sheets of iron foil about .002-in. thick. The film of finish to be tested is about .001-in. in thickness.

To facilitate handling and observation, the thin iron foil is attached, by a colorless resin, to a glass microscope slide 1x3-in., after which a thin film of paint to be tested is brushed on the upper surface of the metal foil.

These tiny test panels are then exposed to a carefully controlled, humid atmosphere in the laboratory, which results in rapid rusting of the metal foil underneath the thin paint film, in much the same way that painted structural steel would ultimately rust under actual conditions of service. The time that elapses before visible rust spots develop on the iron foil gives an indication of the protection afforded by the paint being tested.

With such extremely thin foils, the slightest rusting eats a hole through the metal, which can be easily detected by looking at the test panel from the back. With

Speeds production for coating **WAR PRODUCTS**



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ordinary films laid down on steel panels of the type normally used for testing, no evidence of failure would probably appear until rather severe corrosion of the metal had resulted in partial or complete breakdown of the paint film. With a good finish, this might require a year or more.

This new technique for the evaluation of metal-protective finishes represents a close approximation to a hypothetical testing technique long looked upon as ideal, namely, a system involving the finish being studied and only the surface of a metal test panel.

The metal foil used in this new type of test may be regarded simply as a "surface," since it is only about 1/75 as thick as normal automobile body steel of the type commonly used for testing metal-protective finishes.

The evaluation of pigmented coating compositions for the maintenance of structural steel surfaces against atmospheric corrosion has long been recognized as one of the most difficult fields of testing, because of the many and complex variables encountered.

While the recently devised technique will not dispense with long-time fence and field tests necessary to determine the protection a finish will afford under actual service conditions, it will greatly facilitate testing by making it possible to reject inherently poor finishes before expensive and time-consuming field tests have been made.

This new testing technique is in active use in connection with the development of rust-inhibitive pigments for metal finishes.

Infra-Red Heat-Reflecting Camouflage Paints

A news release from Hill & Knowlton for The Arco Co., Cleveland, Ohio, states that:

"Infra-red heat-reflecting camouflage paints, first developed by The Arco Co. to prevent enemy fliers from penetrating camouflage by infra-red photography, and now devoted entirely to war uses, are expected to find extensive post-war application on the roofs of motor buses and railroad passenger cars.

"The limited use of these visually dark paints on the roofs of motor buses has already demonstrated the fact that they make daytime bus travel more comfortable than in buses that have roofs painted with conventional non-infra-red dark paints. A year's experience has proven that these dull finish paints reflect almost as much heat as aluminum paint. . . .

"The Arco Co. has granted the United States Government the free use of its basic patent on infra-red reflecting paint up to the limit of its requirements. It is estimated that the quantities already produced by various American paint manufacturers under this license, for use on aircraft, camouflage netting, fixed military installations and ammunition, would be more than enough to paint the roof of every street car, bus and Pullman car in the United States."

At the special request of the Quartermaster General of the War Department, the Textile Color Card Association, 200 Madison Ave., New York 16, N. Y., has compiled a standard reference of the authentic flag colors of all the United Nations and the South American republics.

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